REVISIONS TO THE STATE IMPLEMENTATION PLAN (SIP) FOR THE CONTROL OF OZONE AIR POLLUTION

POST-1996 RATE-OF-PROGRESS SIP FOR BEAUMONT/PORT ARTHUR AND HOUSTON/GALVESTON OZONE NONATTAINMENT AREAS

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DECEMBER 13, 1995

95156-SIP-AI

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A. INTRODUCTION

Requirements for State Implementation Plans (SIP) specified in 40 Code of Federal Regulations (CFR) Part 51.12 provide that "...in any region where existing (measured or estimated) ambient levels of pollutant exceed the levels specified by an applicable national standard, "the plan shall set forth a control strategy which shall provide for the emission reductions necessary for attainment and maintenance of such national standard". Ambient levels of sulfur dioxide and oxides of nitrogen (NO_x), as measured from 1975 through 1977, did not exceed the national standards set for these pollutants anywhere in Texas. Therefore, no control strategies for these pollutants were included in revisions to the Texas SIP submitted on April 13, 1979. Control strategies were submitted and approved for inclusion in the SIP for areas in which measured concentrations of ozone, total suspended particulate (TSP), or carbon monoxide (CO) exceeded a National Ambient Air Quality Standard (NAAQS) during the period from 1975 to 1977. On October 5, 1978, the Administrator of the U.S. Environmental Protection Agency (EPA) published a lead ambient air quality standard. The 1977 Amendments to the Federal Clean Air Act (FCAA) required that each state submit an implementation plan for the control of any new criteria pollutant. A SIP revision for lead was submitted in March of 1981.

The control strategies submitted in 1979 contained plans to reduce emissions required by EPA policy to demonstrate attainment of the primary NAAQS by December 31, 1982, except for ozone in the Harris County nonattainment area. For that area, an extension to December 31, 1987 was requested, as provided for in the 1977 FCAA Amendments.

Proposals to revise the Texas SIP to comply with the require-ments of the 1977 Amendments to the FCAA were submitted to EPA on April 13, November 2, and November 21, 1979. On December 18, 1979 (44 Federal Register (FR) 75830-74832), EPA approved the proposed revision to the Texas SIP relating to vehicle inspection and maintenance and extended the deadline for attainment of the NAAQS for ozone in Harris County until December 31, 1987. On March 25, 1980 (45 FR 19231-19245), EPA approved and incorpo-rated into the Texas SIP many of the remaining provisions included in the proposals submitted by the state in April and November 1979. The March 25, 1980 Federal Register notice also included conditional approval of a number of the proposed SIP revisions submitted by the state.

Additional proposed SIP revisions were submitted to EPA by the state on July 25, 1980 and July 20, 1981 to comply with the requirements of the March 25, 1980 conditional approvals. By May 31, 1982, all of the proposed revisions to the Texas SIP submitted to EPA in April and November 1979, July 1980, and July 1981, with the exception of provisions relating to the definition of major modification used in new source review (NSR) and certain portions of the control strategy for TSP in Harris County, had been fully approved or addressed in a Federal Register notice proposing final approval. The NSR provisions were approved on August 13, 1984.

The 1977 Amendments to the FCAA required SIPs to be revised by December 31, 1982 to provide additional emission reductions for those areas for which EPA approved extensions of the deadline for attainment of the NAAQS for ozone or CO. Paragraph B.5. of this section of the SIP contains the revision to the Texas SIP submitted to comply with the 1977 Amendments to the FCAA and EPA rules for 1982 SIP revisions.

The only area in Texas receiving an extension of the attainment deadline to December 31, 1987 was Harris County for ozone. Proposals to revise the Texas SIP for Harris County were submitted to EPA on December 9, 1982. On February 3, 1983, EPA proposed to approve all portions of the plan except for the Vehicle Parameter Inspection/Maintenance (I/M) Program. On April 30, 1983, the EPA Administrator proposed sanctions for failure to submit or implement an approvable I/M program in Harris County. Senate Bill 1205

was passed on May 25, 1983 by the Texas Legislature to provide the Texas Department of Public Safety (DPS) with the authority to implement enhanced vehicle inspection requirements and enforcement procedures. On August 3, 1984, EPA proposed approval of the Texas SIP pending receipt of revisions incorporating these enhanced inspection procedures and measures ensuring enforceability of the program. These additional proposed SIP revisions were adopted by the state on November 9, 1984. Final approval by EPA was published on
June 26, 1985.

Although the control strategies approved by EPA in the 1979 SIP revisions were implemented in accordance with the provisions of the plan, several areas in Texas did not attain the primary NAAQS by December 31, 1982. On February 23, 1983, EPA published a Federal Register notice identifying those areas and expressing the intent to impose economic and growth sanctions provided in the FCAA. However, EPA reversed that policy in the November 2, 1983 Federal Register, deciding instead to call for supplemental SIP revisions to include sufficient additional control requirements to demonstrate attainment by December 31, 1987.

On February 24, 1984, the EPA Region 6 Administrator notified the Governor of Texas that such supplemental SIP revisions would be required within one year for ozone in Dallas, Tarrant, and El Paso Counties and CO in El Paso County. The Texas Air Control Board (TACB) requested a six-month extension of the deadline (to August 31, 1985) on October 19, 1984. EPA approved this request on November 16, 1984.

Proposals to revise the Texas SIP for Dallas, Tarrant, and El Paso Counties were submitted to EPA on September 30, 1985. However, the revisions for Dallas and Tarrant Counties did not provide sufficient volatile organic compound (VOC) reductions to demonstrate attainment of the ozone standard and on July 14, 1987, EPA published intent to invoke sanctions. Public officials in the two counties expressed a strong desire to provide additional control measures sufficient to satisfy requirements for an attainment demonstration.

A program of supplemental controls was taken to public hearings in late October 1987. As a result of testimony received at the hearings, a number of the controls were modified and several were deleted, but sufficient reductions were retained to demonstrate attainment by December 31, 1991. These controls were adopted by the TACB on December 18, 1987 and were submitted to EPA as proposed revisions to the SIP.

The FCAA Amendments of 1990 authorized EPA to designate areas failing to meet the NAAQS for ozone as nonattainment and to classify them according to severity. The four areas in Texas and their respective classifications included: Houston/Galveston (severe), Beaumont/Port Arthur (serious), El Paso (serious), and Dallas/Fort Worth (moderate).

The FCAA Amendments required a SIP revision to be submitted for all ozone nonattainment areas classified as moderate and above by November 15, 1993 which described in part how an area intends to decrease VOC emissions by 15%, net-of-growth, by November 15, 1996. In addition to the 15% reduction, states must also pre-pare contingency rules that will result in an additional 3.0% reduction of either NO_X or VOC, of which up to 2.7% may be reductions in NO_X. Underlying this substitution provision is the recognition that NO_X controls may effectively reduce ozone in some areas and that the design of strategies is more efficient when the characteristic properties responsible for ozone formation and control are evaluated for each area. The primary condition to use NO_X controls as contingency measures is a demonstration, using the Urban Airshed

Model (UAM), that these controls will be beneficial toward the reduction of ozone. These VOC and/or NO_X contingency measures would be implemented immediately should any area fall short of the 15% goal.

Texas submitted rules to meet the Rate-of-Progress (ROP) reduction in two phases. Phase I consisted of a core set of rules comprising a significant portion of the required reductions. This phase was submitted by the original deadline of November 15, 1993. A commitment listing the potential rules, from which the additional required reductions and contingency measures were to be selected, was submitted in conjunction with the Phase I SIP on November 15, 1993. That list of Phase II rules was intended to rank options available to the state and to identify potential rules available to meet 100% of the ROP reductions and contingencies.

Phase II consisted of any remaining percentage toward the 15% net-of-growth reductions. Phase II was submitted on May 13, 1994. Complete contingency measures for the Dallas/Fort Worth (DFW) and El Paso (EP) nonattainment areas were included in the Phase II submittal. In light of revised EPA guidance, the complete list of contingency measures for the Houston/Galveston (HGA) and Beaumont/Port Arthur (BPA) nonattainment areas is included in this SIP Revision. The appropriate compliance date for the 15% ROP rules was incorporated into each control measure to ensure that the required reductions will be achieved by the November 15, 1996 deadline. Only those portions of the Phase II rules needed to provide reasonable assurance of achieving the targeted reduction requirements were adopted by the Texas Natural Resource Conservation Commission (TNRCC) on May 4, 1994.

The DFW and ELP areas achieved sufficient reductions with the 15% ROP SIP to demonstrate attainment by 1996. Attainment Demonstration SIP Revisions for these two areas were submitted on September 14, 1994.

The FCAA Amendments of 1990 require a Post-96 ROP SIP revision and accompanying rules to be submitted by November 15, 1994. According to the FCAA Amendments, this submittal must contain an Attainment Demonstration based on UAM. Additionally, the revision must demonstrate how the HGA and BPA nonattainment areas intend to achieve a 3% per year reduction of VOC and/or NO_x until the year 1999 for BPA or 2007 for HGA, and additional reductions as needed to demonstrate modeled attainment. The plan must also carry an additional 3% of contingency measures to be implemented if the nonattainment area fails to meet a deadline. To use NO_X reductions for all or part of the Post-96 controls or the contingency measures requires a demonstration using UAM that NO_X controls would be beneficial in reducing ozone.

On November 9, 1994, the state submitted a SIP revision designed to meet the 3% per year ROP requirements for the years 1997-1999. This Post-96 ROP SIP revision detailed how the BPA and HGA nonattainment areas intend to achieve these three years' reductions of VOC (or 9% net-of-growth). Most of this amount was achieved by quantifying additional reductions due to existing rules and reductions due to federally-mandated rules. Rules to achieve the further reductions needed to meet the ROP SIP goal were submitted to EPA on January 11, 1995.

The state also submitted UAM modeling results that showed the relationship between emission levels of VOC and NO_X, and ozone concentrations. This modeling was submitted with the adopted rules on January 11, 1995. Based on the preliminary results of this modeling, which show a disbenefit to NO_X reductions, on April 12, 1995, the state received a temporary Section 182(f) exemption from all NO_X requirements including reasonably available control technology (RACT), I/M, NO_X New Source Review, and transportation conformity requirements. This exemption was permanent for DFW and ELP, and temporary until December 31, 1996 for HGA and BPA.

On March 2, 1995, Mary Nichols, EPA Assistant Administrator for Air and Radiation, issued a memo which gives states some flexibility to design a phased Attainment Demonstration. It provides for an initial phase which is intended to continue progress in reducing levels of VOC and/or NO_X while giving states an opportunity to address scientific issues such as modeling and transport. The second phase is designed to draw upon the results of the scientific effort and design a plan to bring the area into attainment. To constitute Phase I under this approach, the EPA guidance required that states submit the following SIP elements by December 31, 1995:

♦ Control strategies to achieve reductions of ozone precursors in the amount of 3% per year from the 1990 baseline emissions inventory (EI) for the years 1997, 1998, and 1999.

♦ UAM modeling out through the year 1999, showing the effect of previously-adopted control strategies which were designed to achieve a 15% reduction in VOCs from 1990 through 1996.

♦ A demonstration that the state has met the VOC RACT requirements of the FCAA Amendments.

♦ A detailed schedule and plan for the "Phase II" portion of the attainment demonstration which will show how the nonattainment areas can attain the ozone standard by the required dates.

♦ An enforceable commitment to:

  ♦ Participate in a consultative process to address regional transport,

- ♦ Adopt additional control measures as necessary to attain the ozone NAAQS, meet ROP requirements, and eliminate significant contribution to nonattainment downwind, and

- ♦ Identify any reductions that are needed from upwind areas to meet the NAAQS.

Texas submitted the first two of these required sections in November 1994. The remaining three, a VOC RACT demonstration, the required commitments, and a Phase II plan and schedule, are included in this SIP revision.

B. OZONE CONTROL STRATEGY

1. POLICY AND PURPOSE

a.-d. (No change.)

2. SUMMARY OF THE PRINCIPAL ELEMENTS ADDRESSED WITHIN THIS PLAN

a.-c. (No change.)

d. Required Emission Reductions

Emission reduction requirements for each nonattainment area are related to the degree by which baseline air quality exceeds the NAAQS for ozone. Reduction requirements are calculated by the use of algorithms or models that rely on measured data as well as certain assumed values. These procedures and the various factors involved in each are discussed in detail in subsequent sections concerned with specific SIP revisions.

Previously, EPA required that emission reduction requirements were to be calculated only for urban nonattainment areas. The 1990 FCAA Amendments recognized that often suburban and rural (perimeter) counties can contribute to ozone nonattainment in an area. Therefore, in most cases, the concept of nonattainment was expanded to include entire Consolidated Metropolitan Statistical Areas (CMSA) or Metropolitan Statistical Areas.

The FCAA Amendments of 1990 require a Post-96 ROP SIP revision and accompanying rules to be submitted by November 15, 1994. This submittal must contain an Attainment Demonstration based on UAM. Additionally, the revision must demonstrate how the HGA and BPA nonattainment areas intend to achieve a 3% per year reduction of VOC and/or NO_x until the year 1999 for BPA or 2007 for HGA, and additional reductions if needed to demonstrate modeled attainment. The plan must also carry an additional 3% of contingency measures to be implemented if the nonattainment area fails to meet a deadline.

On November 9, 1994, the state submitted a SIP revision designed to meet the 3% per year ROP requirements for the years 1997-1999. This SIP revision details how the BPA and HGA nonattainment areas intend to achieve these three years' reductions of VOC (or 9% net-of-growth). Most of this amount was achieved by quantifying additional reductions due to existing rules and reductions due to federally-mandated rules. Rules to achieve the further reductions needed to meet the ROP SIP goal were submitted to EPA on January 11, 1995.

e. (No Change.)

3. OZONE CONTROL PLAN FOR 1979 SIP REVISION (No Change.)

4. CONTROL STRATEGY FOR 1979 SIP REVISION (No Change.)

5. 1982 HARRIS COUNTY SIP REVISION (No Change.)

6. SIP REVISIONS FOR POST-1982 URBAN NONATTAINMENT AREAS (No Change.)

7. SIP REVISIONS FOR 1993 RATE-OF-PROGRESS (No Change.)

8. SIP REVISIONS FOR MOBILE SOURCES (No Change.)

9. SIP REVISIONS FOR THE ATTAINMENT DEMONSTRATION (No Change.)

10. SIP REVISIONS FOR THE REDESIGNATION AND MAINTENANCE PLANS (No Change.)

11. SIP REVISIONS FOR POST-96 RATE-OF-PROGRESS (Revised.)

a. Ozone Control Plan

1) General

The FCAA Amendments of 1990 require a Post-96 ROP SIP revision and accompanying rules to be submitted by November 15, 1994. This submittal must contain an Attainment Demonstration based on

UAM. Additionally, the revision must demonstrate how the HGA and BPA nonattainment areas intend to achieve a 3% per year reduction of VOC and/or NO_x until the year 1999 for BPA or 2007 for HGA, and additional reductions if needed to demonstrate modeled attainment. The plan must also carry an additional 3% of contingency measures to be implemented if the nonattainment area fails to meet a deadline.

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On March 2, 1995, Mary Nichols, EPA Assistant Administrator for Air and Radiation, issued a memo which gives states some flexibility to design a phased Attainment Demonstration. It provides for an initial phase which is intended to continue progress in reducing levels of VOC and/or NO_X while giving states an opportunity to address scientific issues such as modeling and transport. The second phase is designed to draw upon the results of the scientific effort and design a plan to bring the area into attainment. To constitute Phase I under this approach, the EPA guidance required that states submit the following SIP elements by December 31, 1995:

- Control strategies to achieve reductions of ozone precursors in the amount of 3% per year from the 1990 baseline EI for the years 1997, 1998, and 1999.

- UAM modeling out through the year 1999, showing the effect of previously-adopted control strategies which were designed to achieve a 15% reduction in VOCs from 1990 through 1996.

- A demonstration that the state has met the VOC RACT requirements of the FCAA Amendments.

- A detailed schedule and plan for the "Phase II" portion of the attainment demonstration which will show how the nonattainment areas can attain the ozone standard by the required dates.

- An enforceable commitment to:

    - Participate in a consultative process to address regional transport,

    - Adopt additional control measures as necessary to attain the ozone NAAQS, meet ROP requirements, and eliminate significant contribution to nonattainment downwind, and

    - Identify any reductions that are needed from upwind areas to meet the NAAQS.

Texas submitted the first two of these required sections in November 1994. The remaining three, a RACT demonstration, the required commitments, and a Phase II plan and schedule, are included in this SIP revision.

a) Requirement For Reductions

The November, 1994 Post-96 SIP submittal detailed how Texas intends to achieve the ROP reduction of VOC from 1997 to 1999 (or 9% net-of-growth). Most of this amount was achieved by quantifying additional reductions due to existing rules and reductions due to federally-mandated rules. Rules to achieve the further reductions needed to meet the ROP goal were submitted to EPA on January 11, 1995.

2) Ozone Nonattainment Area Designations in Texas (No Change.)

3) Local Consultation (No Change.)

4) Identification of Emission Changes

a) Urban Airshed Modeling (UAM)

ROP SIP modeling is being developed for the HGA and BPA nonattainment areas in two phases using the UAM. The first phase of ROP modeling was based on historical ozone episodes. This modeling was submitted to EPA on January 11, 1995. The second phase of the ROP modeling is being conducted using data obtained primarily from the Coastal Oxidant Assessment for Southeast Texas (COAST) project, an intensive 1993 field study. The COAST modeling for BPA is projected to be completed by May 1996 with an associated SIP submittal by November 1996. The COAST modeling for HGA and associated SIP are projected to be completed by December, 1996 for submittal in May of 1997. Control strategies developed in this second phase will be based on a more robust data base, providing a higher degree of confidence that the strategies will result in attainment of the ozone NAAQS. A discussion of the schedule for the UAM modeling including the COAST data for the Phase II Attainment Demonstration can be found in Appendix F.

b) Emissions Inventory (EI) (No Change.)

c) Factors Affecting Magnitude of VOC Emissions

(1) Changes in Stationary and Area Source Emissions Regulations

(a) Additional Control Techniques Guidelines (CTGs), Federal Rules, and Other Federal and State Programs

(i) Additional CTGs and Reasonably Available Control Technology (RACT)

Section 182(b)(2) of the FCAA requires implementation of RACT for ozone nonattainment areas classified as moderate and above for: (A) each category of VOC sources covered by a CTG document issued between November 15, 1990 and the date of attainment; (B) all VOC sources covered by any CTG document issued prior to November 15, 1990; and (C) all other major stationary sources of VOCs.

CTGs are EPA guidance documents which are intended to provide state and local air pollution control agencies with an information base for proceeding with their own analysis of RACT to meet statutory requirements. These documents review existing information and data concerning the technical capability and cost of various control techniques to reduce emissions. Each CTG document contains a recommended "presumptive norm" for RACT for a particular source category, based on EPA's evaluation of capabilities and problems general to the source category. However, the presumptive norm is only a recommendation, and state and local air pollution control agencies may choose to develop their own RACT requirements on a case-by-case basis, considering the economic and technical circumstances of the individual source category within an area.

For sources specified in §182(b)(2)(B) and (C), the TNRCC has previously adopted VOC RACT rules or has demonstrated that no major sources exist for specific source categories. For sources specified in §182(b)(2)(A), EPA has issued only one CTG document, Control of Volatile Organic Compound Emissions From Reactor Processes and Distillation Operations Processes in the Synthetic Organic Compound Manufacturing Industry (SOCMI), November 15, 1993. The TNRCC adopted RACT rules for SOCMI reactor processes and distillation operations on November 10, 1993.

The other categories for which EPA was to issue CTGs under §182(b)(2)(A) include VOC storage tanks, automotive refinishing, SOCMI batch processes, industrial wastewater, cleanup solvents, wood furniture coatings, plastic parts (automotive and business machines) coatings, and offset printing. Instead of issuing CTGs for these source categories, EPA issued guidance documents known as Alternative Control Techniques (ACT) documents. The ACTs do not establish the presumptive norm for RACT but merely contain information on emissions, controls, control options, and costs. EPA itself has consistently noted in the ACTs that each ACT "presents options only, and does not contain a recommendation on RACT." Clearly, the ACTs are not RACT-defining documents like CTGs, but are information documents only, which leave to the states the decision about the level of control that represents RACT. Further, the ACTs do not constitute a benchmark to which RACT as established by a state can be compared. Consequently, the TNRCC is under no obligation to adopt any of the suggested control options contained within the ACT documents. Likewise, the TNRCC is under no obligation to adopt any of the suggested control options contained within the draft CTG documents.

EPA's failure to promulgate CTGs as presumptive RACT results in the authority to define RACT being passed to the states. Because ACTs are represented as guidance only, EPA's strict adherence to them as establishing presumptive RACT goes beyond the intent of the 1990 CAAA, because the 1990 CAAA charged EPA to define RACT through the CTG promulgation process. EPA's failure to do so has resulted in no establishment of presumptive RACT. EPA's adherence to the ACTs as presumptive RACT is violative of statutory and common law principles in that it is an arbitrary and capricious act on the part of EPA without opportunity for due process through the established public comment process.

EPA has stated that for certain categories the Maximum Achievable Control Technology (MACT) standard establishes the RACT level of control. However, the definition of RACT states that all categories should be covered to an appropriate degree of technical feasibility and economic reasonableness. MACT is the most stringent 12% in use and thus cannot be mandatorily equated with RACT. The MACT definition is inherently more stringent than RACT. Therefore, the TNRCC believes that it is beyond the intent of the 1990 CAAA for EPA to define RACT as equivalent to, or more stringent than, MACT. Finally, the TNRCC believes that its existing VOC rules demonstrate substantial compliance with EPA's guidance on RACT. Since the common law principle of substantial compliance is typically upheld by the courts, the TNRCC does not believe that additional RACT requirements are necessary at this time.

The 1990 FCAA Amendments require states to insure that RACT is in place for all major VOC sources in moderate and above ozone nonattainment areas. Although the TNRCC believes existing state or proposed federal rules represent a reasonable level of control and thus fulfill the RACT requirements, the remainder of this section further discusses the TNRCC demonstration that the VOC RACT requirements have been met on required and major source categories.

Storage Tanks

Existing rules (§§115.112-115.119) are in place for all counties in the BPA, DFW, ELP, and HGA nonattainment areas. These rules are based upon CTGs issued in 1977-1978. EPA has issued an ACT document for storage tanks which suggests: (1) lowering the vapor pressure exemption level to 0.5 or 0.75 psia; (2) upgrading of vapor-mounted primary seals on internal floating roof tanks at tank turnaround; (3) installation of secondary seals on external floating roof tanks which previously had been exempt from secondary seal requirements at tank turnaround; (4) 95% control efficiency for add-on control devices; and (5) installation of gasketed seals. These will be addressed in order.

(1) <u>Vapor Pressure:</u> The most stringent exemption level suggested by EPA's ACT would require installation of floating roofs at tanks with a nominal storage capacity of $\geq$ 40,000 gallons which store VOCs with a vapor pressure (vp) of $\geq$ 0.5 psia. The TNRCC's current rule requires installation of floating roofs at tanks with a nominal storage capacity of $\geq$ 25,000 gallons which store VOC with a vapor pressure of $\geq$ 1.5 psia. These exemption levels will be compared through 1) use of the TNRCC's EI for the BPA, DFW, ELP, and HGA ozone nonattainment areas; and 2) an analysis of the storage tanks which are exempted by the ACT and TNRCC's existing rule. A summary is as follows:

Tanks Which Are Exempted

EPA's ACT	TNRCC's Existing Rule
<40,000 gal. (any vp)	<25,000 gal. (any vp)
AND	AND
≥40,000 gal. and <0.5 psia	≥25,000 gal. and <1.5 psia

This can be rewritten as:

<40,000 gal. (any vp)	<25,000 gal. (any vp)
AND	AND
≥40,000 gal. and <0.5 psia	25,000 ≥ x <40,000 and <1.5 psia
	AND
	≥40,000 gal. and <1.5 psia

This in turn can be rewritten as:

<40,000 gal. (any vp)	<25,000 gal. (any vp)
AND	AND
≥40,000 gal. and <0.5 psia	25,000 ≥ x <40,000 and <1.5 psia
	AND
	≥40,000 gal. and <0.5 psia
	AND
	≥40,000 gal. and 0.5 ≥ x <1.5 psia

The "≥40,000 gal. and <0.5 psia" category appears on both sides and can be subtracted. This leaves:

<40,000 gal. (any vp)	<25,000 gal. (any vp)
	AND
	25,000 ≥ x <40,000 and <1.5 psia
	AND
	≥40,000 gal. and 0.5 ≥ x <1.5 psia

Rewriting the left side:

<25,000 gal. (any vp)	<25,000 gal. (any vp)
AND	AND
25,000 ≥ x <40,000 gal. (any vp)	25,000 ≥ x <40,000 and <1.5 psia

	AND
	≥40,000 gal. and 0.5 ≥ x <1.5 psia

Subtracting the "<25,000 gal. (any vp)" category from both sides and rewriting the remaining term on the left side gives:

25,000 ≥ x <40,000 gal. and < 1.5 psia	25,000 ≥ x <40,000 and <1.5 psia
25,000 ≥ x <40,000 gal. and ≥ 1.5 psia	AND
	≥40,000 gal. and 0.5 ≥ x <1.5 psia

Now subtract the "25,000 ≥ x <40,000 gal. and < 1.5 psia" category from both sides to get:

25,000 ≥ x <40,000 gal. and ≥ 1.5 psia	≥40,000 gal. and 0.5 ≥ x <1.5 psia

If emissions associated with the term on the left (E_{EPA}) are larger than the emissions associated with the term on the right (E_{TNRCC}), based on an EI retrieval for each of the four ozone nonattainment areas, then this would show that EPA's ACT exempts more emissions (net) based on size and vapor pressure than the TNRCC's current rule. The term (E_{TNRCC} - E_{EPA}) gives the magnitude of any increased emissions due to the TNRCC's exemption levels as compared to the ACT's exemption levels for size and vapor pressure.

A summary of a review of the EI data for each of the four nonattainment areas is as follows:

	E_{EPA} (TPY)	E_{TNRCC} (TPY)	$(E_{TNRCC} - E_{EPA})$ (TPY)
BPA	3.44	6.39	2.95
DFW	2.64	0.05	-2.59
ELP	0.59	1.13	0.54
HGA	36.29	308.70	272.41

(2) Vapor-mounted primary seals on internal floating roof tanks (IFRTs). EPA's ACT suggests that upgrading of vapor-mounted primary seals on IFRTs be required at tank turnaround. According to EPA's storage tank ACT (page 3-20), the emissions from IFRTs can be estimated by the following equation:

$$L_T = L_W + L_R + L_F + L_D,$$

where

L_T = the total loss;

L_W = the withdrawal loss;

L_R = the rim seal loss;

L_F = the deck fitting loss; and

L_D = the deck seam loss.

Examination of the equations for L_W, L_R, L_F, and L_D revealed that the type of primary seal is a factor only in the equation for L_R. Therefore, L_W, L_F, and L_D will not change no matter what type of primary seal an IFRT has. For the rim seal loss (L_R):

$$L_R = K_R \, D \, P^* \, M_V \, K_C / 2205,$$

where

L_R = the rim seal loss (Mg/yr);

K_R = the rim seal loss factor (lb-mole/ft-yr);

D = tank diameter (feet);

P^* = the vapor pressure function (dimensionless)

= $0.068 P / ([1 + (1 - 0.068 P)^{0.5}]^2)$,

where P = true vapor pressure (psia) of the VOC stored;

M_V = average molecular weight of the vapor (lb/lb-mole); and

K_C = the product factor (dimensionless).

For an IFRT with a vapor-mounted primary seal only, K_R is 6.7, while for an IFRT with a liquid-mounted primary seal only, K_R is 3.0. Therefore, if all other factors are held constant, then the rim seal loss (L_R) will be (3.0 / 6.7) = 0.448 times lower for an IFRT with a liquid-mounted primary seal only as compared to an IFRT with a vapor-mounted primary seal only (allowed under the TNRCC's rule). The decrease in emissions from implementing the control requirements of the ACT logically can not be larger than L_T; i.e., the smallest that emissions can mathematically be under the tank configuration suggested by EPA's ACT is zero.

It should be noted that EI extracts give only L_T, the total emissions, which includes L_W, L_R, L_F, and L_D; i.e., L_R is not available from the EI except by a manual file search. Therefore, scaling down L_T, rather than L_R, to give the emissions under EPA's ACT will also scale down L_W, L_F, and L_D, although these three emission types are independent of the type of primary seal. Also, no attempt was made to subtract out the tanks storing

VOC with a vapor pressure below 0.5 psia. Consequently, this approach will indicate that the difference in emissions between the ACT and TNRCC's existing rule is larger than it actually is.

A summary of the EI extracts (one for each of the four nonattainment areas) listing the IFRTs which are $\geq$40,000 gallons AND are equipped with vapor-mounted primary seals AND which have no secondary seal is as follows:

- BPA Tanks with total emissions, L_T, of 335.94 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 335.94 TPY.

- DFW Tanks with total emissions, L_T, of 8.63 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 8.63 TPY.

- ELP Tanks with total emissions, L_T, of 4.17 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 4.17 TPY.

- HGA Tanks with total emissions, L_T, of 177.12 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 177.12 TPY.

(3) <u>Installation of secondary seals on external floating roof tanks (EFRTs) which currently have only primary seals.</u> EPA's ACT suggests that EFRTs which were previously exempt from the requirement to have secondary seals be required to upgrade to secondary seals at tank turnaround. According to EPA's storage tank ACT (page 3-15), the emissions from EFRTs can be estimated by the following equation:

$$L_T = L_S + L_W,$$

where

L_T = the total loss;

L_S = the standing loss; and

L_W = the withdrawal loss.

According to page 3-6 of the ACT, $L_S = L_R + L_F$, where

L_R = the rim seal loss; and

L_F = the deck fitting loss;

Therefore, $L_T = L_R + L_F + L_W$.

Examination of the equations for L_R, L_F, and L_W revealed that the presence or absence of a secondary seal is a factor only in the equation for L_R. Therefore, L_F and L_W will not change no matter what type of seals an EFRT has. For the rim seal loss (L_R):

$$L_R = K_R V^N D P^* M_V K_C / 2205,$$

where

L_R = the rim seal loss (Mg/yr);

K_R = the rim seal loss factor (lb-mole/(mph)^N ft-yr);

V = average wind speed (mph);

N = rim seal-related wind speed exponent (dimensionless);

D = tank diameter (feet);

P^* = the vapor pressure function (dimensionless)

$= \quad 0.068\ P / ([1 + (1 - 0.068\ P)^{0.5}]^2)$,

where P = true vapor pressure (psia) of the VOC stored;

M_V = average molecular weight of the vapor (lb/lb-mole); and

K_C = the product factor (dimensionless).

From Table 3-2 of the storage tank ACT, K_R and N vary depending on whether the primary seal is a mechanical shoe, a liquid-mounted seal, or a vapor-mounted seal. The average wind speed, V, for BPA, DFW, ELP, and HGA is 9.7, 10.7, 8.8, and 7.9 mph, respectively, according to 1993 meteorological data from the TNRCC Monitoring Operations Division. Therefore, $K_R V^N$ for various seal configurations is calculated as follows for each of the four nonattainment areas:

Seal Type	**K_R**	**N**	**$K_R V^N$ BPA**	**$K_R V^N$ DFW**	**$K_R V^N$ ELP**	**$K_R V^N$ HGA**
Mechanical shoe primary only	1.2	1.5	36.3	42.0	31.3	26.6
Mechanical shoe primary with shoe-mounted secondary	0.8	1.2	12.2	13.8	10.9	9.6
Liquid-mounted primary only	1.1	1.0	10.7	11.8	9.7	8.7
Liquid-mounted primary with rim-mounted secondary	0.7	0.4	1.7	1.8	1.7	1.6
Vapor-mounted primary only	1.2	2.3	223.2	279.7	178.4	139.2

If all other variables are held constant, the effect on the rim seal loss emissions due to adding a secondary seal depends only on the value of $K_R V^N$ for the different types of primary seal. The difference in rim seal loss emissions between the TNRCC's current rule and EPA's ACT is determined by comparing the value of $K_R V^N$ for a primary seal only to the value of $K_R V^N$ for the minimum acceptable configuration according to the ACT.

For example, an EFRT in HGA with only a vapor-mounted primary seal has a $K_R V^N$ value of 139.2. EPA's ACT would require this tank to be upgraded to at least a mechanical shoe primary seal and shoe-mounted secondary seal. For HGA, this configuration has a $K_R V^N$ value of 9.6. Therefore, the rim seal loss (L_R) will be (9.6 / 139.2) = 0.069 times lower for the ACT's minimum requirements of a primary and secondary seal than for the vapor-mounted primary seal (allowed under the TNRCC's rule).

It should be noted that EI extracts give only L_T, the total emissions, which includes L_W, L_R, and L_F; i.e., L_R is not available from the EI except by a manual file search. Therefore, scaling down L_T, rather than L_R, will also scale down L_W and L_F, although these two emission types are independent of the presence of absence of a secondary seal. Also, no attempt was made to subtract out the tanks storing VOC with a vapor pressure below 0.5 psia. Consequently, this approach will indicate that the difference in emissions between the ACT and TNRCC's existing rule is larger than it actually is. Logically, this can not be larger than L_T; i.e., the smallest that emissions can mathematically be under the tank configuration suggested by EPA's ACT is zero.

A summary of the EI extracts (one for each of the four nonattainment areas, broken down according to primary seal type) listing the EFRTs which are $\geq$ 40,000 gallons AND which have no secondary seal is as follows:

<u>Mechanical shoe primary only:</u>

♦ BPA Tanks with total emissions, L_T, of 141.95 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 141.95 TPY.

♦ DFW Tanks with total emissions, L_T, of 2.55 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 2.55 TPY.

♦ ELP No affected storage tanks were identified.

♦ HGA Tanks with total emissions, L_T, of 192.99 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 192.99 TPY.

<u>Liquid-mounted primary only:</u>

♦ BPA Tanks with total emissions, L_T, of 19.89 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 19.89 TPY.

♦ DFW No affected storage tanks were identified.

♦ ELP No affected storage tanks were identified.

♦ HGA Tanks with total emissions, L_T, of 22.89 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 22.89 TPY.

<u>Vapor-mounted primary only:</u>

♦ BPA Tanks with total emissions, L_T, of 0.12 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 0.12 TPY.

♦ DFW Tanks with total emissions, L_T, of 0.37 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 0.37 TPY.

♦ ELP No affected storage tanks were identified.

♦ HGA Tanks with total emissions, L_T, of 144.82 TPY were identified. Therefore, the worst case difference in emissions between EPA's ACT and the TNRCC's current rule is 144.82 TPY.

(4) <u>95% control efficiency for add-on control devices</u>. EPA's ACT suggests that emissions from storage tanks which are routed to a control device should be controlled by a device which has an efficiency of at least 95%. The TNRCC's current rule requires that add-on controls have a minimum efficiency of 90%. The emissions increase (L_{INC}) due to having a control efficiency below the ACT's suggested minimum of 95% is:

$$L_{INC} = L_T - \left[\frac{L_T}{(1 - CE_{actual})} \right] x\ (1 - 0.95)$$

$$= L_T - \left[1 - \frac{0.05}{(1 - CE_{actual})} \right],$$

where

L_T = the tank emissions at a control efficiency less than 95%; and

CE_{actual} = the actual control efficiency.

Results of EI extracts (one for each of the four nonattainment areas) which list the fixed roof tanks which are $\geq$40,000 gallons AND which are controlled by a control device with a control efficiency below 95% but at least 90% are as follows:

♦ BPA No affected storage tanks were identified.

♦ DFW Increased emissions are 1.82 TPY.

♦ ELP No affected storage tanks were identified.

♦ HGA Increased emissions are 4.88 TPY.

(5) Installation of gasketed seals on deck fittings (access hatches, automatic gauge float wells, sample wells, etc.) Information on the deck fitting gaskets is not available without conducting a very time-intensive study of the paper copies of individual EIs in the files. It is assumed that these losses are insignificant in light of the extremely conservative approach taken in calculating the difference in emissions between EPA's ACT and the TNRCC's current rule for: 1) vapor-mounted primary seals on IFRTs; and 2) installation of secondary seals on EFRTs which currently have only primary seals.

Comparison using the "5% rule." The 5% rule provides a mechanism for states to justify exemptions or cutpoints which are more lenient than EPA's RACT baseline. It is applied by determining the total emissions allowed by EPA's RACT baseline (including exemptions) and comparing this to the emissions allowed (including exemptions) by a state regulation. If the difference is less than 5%, EPA considers that there is no substantive difference between state and EPA requirements. The 5% justification for each rule category must be applied separately to each nonattainment area.

The total storage tank emissions, E_{EI}, for all tanks in each of the four nonattainment areas are as follows:

♦ BPA 6881.43 TPY

- ♦ DFW 387.60 TPY

- ♦ ELP 197.51 TPY

- ♦ HGA 12,358.39 TPY

These totals include emissions from tanks controlled by and exempted from the TNRCC's current rules. These emission totals would be reduced by implementing the suggestions of Items (1)-(5) as given in EPA's ACT. For each nonattainment area, the total adjustments (E_{ADJ}) to reflect EPA's suggested level of control are determined by totaling the differences between the TNRCC and EPA control levels for Items (1) -(5) and are as follows:

- ♦ BPA 2.95 + 335.94 + 141.95 + 19.89 + 0.12 + 0.0 = 500.85 TPY

- ♦ DFW (-2.59) + 8.63 + 2.55 + 0.0 + 0.37 + 1.82 = 10.78 TPY

- ♦ ELP 0.54 + 4.17 + 0.0 + 0.0 + 0.0 + 0.0 = 4.71 TPY

- ♦ HGA 272.41 + 177.12 + 192.99 + 22.89 + 144.82 + 4.88 = 815.11 TPY

Therefore, if the suggested controls of the storage tank ACT were implemented, the total emissions in each nonattainment area would be E_{EI} - E_{ADJ} = E_{ACT}, as summarized below:

- ♦ BPA 6881.43 - 500.85 = 6380.58 TPY

- DFW 387.60 - 10.78 = 376.82 TPY

- ELP 197.51 - 4.71 = 192.80 TPY

- HGA 12,358.39 - 815.11 = 11,543.28 TPY

For each nonattainment area, the 5% rule can be used if E_{EI} is less than (1.05) E_{ACT}. A comparison of E_{EI} to (1.05) x (E_{ACT}) is as follows:

Area	**Post-control Emissions (E_{EI}) (TPY)**	**Post-control Emissions (E_{ACT}) (TPY)**	**(1.05) x (E_{ACT}) (TPY)**
BPA	6881.43	6380.58	6699.61
DFW	387.60	376.82	395.66
ELP	197.51	192.80	202.44
HGA	12,358.39	11,543.28	12,120.44

Since E_{EI} is less than (1.05) x (E_{ACT}) for DFW and ELP, the TNRCC's existing storage tank rules represent RACT for these areas, even though an extremely conservative approach was taken in calculating the difference in emissions between EPA's ACT and the TNRCC's current rule for: 1) vapor-mounted primary seals on IFRTs; and 2) installation of secondary seals on EFRTs which currently have only primary seals. Because E_{EI} is greater than (1.05) x (E_{ACT}) for BPA and HGA, the difference in emissions associated with upgrading IFRTs which have vapor-mounted primary seals and EFRTs which do not have secondary seals will be re-evaluated in order to more realistically determine the actual emissions difference.

Re-evaluation of emissions reduction from upgrading of vapor-mounted primary seals on IFRTs and from installation of secondary seals on EFRTs which currently have only primary seals. EI staff reviewed several tanks from half a dozen accounts in BPA and HGA for rim seal losses as a percentage of the total tank loss. Rim seal losses were typically 30% to 45% of the total emissions for these tanks.

Upgrading of vapor-mounted primary seals on IFRTs. As discussed earlier, if all other factors are held constant, then the rim seal loss (L_R) will be (3.0 / 6.7) = 0.448 times lower for an IFRT with a liquid-mounted primary seal only as compared to an IFRT with a vapor-mounted primary seal only (allowed under the TNRCC's rule). A summary of the EI extracts for BPA and HGA listing the IFRTs which are $\geq$ 40,000 gallons AND are equipped with vapor-mounted primary seals AND which have no secondary seal is as follows:

- ♦ BPA IFRTs with total emissions, L_T, of 335.94 TPY were identified. Of the 335.94 TPY, up to 45% are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (3.0 / 6.7)] (0.45) (335.94 TPY) = 83.45 TPY.

- ♦ HGA IFRTs with total emissions, L_T, of 177.12 TPY were identified. Of the 177.12 TPY, up to 45% are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (3.0 / 6.7)] (0.45) (177.12 TPY) = 44.00 TPY.

Installation of secondary seals on EFRTs which currently have only primary seals. As discussed earlier, if all other vari-ables are held constant, the effect on the rim seal loss emissions due to adding a secondary seal depends only on the value of $K_R V^N$ for the different types of primary seal. The difference in rim seal loss emissions between the TNRCC's current rule and EPA's ACT is determined by comparing the value of $K_R V^N$

for a primary seal only to the value of $K_R V^N$ for the minimum acceptable configuration according to the ACT. A summary of the EI extracts for BPA and HGA (broken down according to primary seal type) listing the EFRTs which are $\geq$40,000 gallons AND which have no secondary seal is as follows:

Mechanical shoe primary only:

♦ BPA Tanks with total emissions, L_T, of 141.95 TPY were identified. Of the 141.95 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (12.2 / 36.3)] (0.45) (141.95 TPY) = 42.41 TPY.

♦ HGA Tanks with total emissions, L_T, of 192.99 TPY were identified. Of the 192.99 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (9.6 / 26.6)] (0.45) (192.99 TPY) = 55.50 TPY.

Liquid-mounted primary only:

♦ BPA Tanks with total emissions, L_T, of 19.89 TPY were identified. Of the 19.89 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (1.7 / 10.7)] (0.45) (19.89 TPY) = 7.53 TPY.

♦ HGA Tanks with total emissions, L_T, of 22.89 TPY were identified. Of the 22.89 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (1.6 / 8.7)] (0.45) (22.89 TPY) = 8.41 TPY.

Vapor-mounted primary only:

♦ BPA Tanks with total emissions, L_T, of 0.12 TPY were identified. Of the 0.12 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (12.2 / 223.2)] (0.45) (0.12 TPY) = 0.05 TPY.

♦ HGA Tanks with total emissions, L_T, of 144.82 TPY were identified. Of the 144.82 TPY, up to 45%, are due to rim seal losses. Therefore, the maximum difference in emissions between EPA's ACT and the TNRCC's current rule is [1 - (9.6 / 139.2)] (0.45) (144.82 TPY) = 60.67 TPY.

Revised comparison using the "5% rule." As before, the total storage tank emissions, E_{EI}, for all tanks in BPA and HGA are as follows:

♦ BPA 6881.43 TPY

♦ HGA 12,358.39 TPY

These totals include emissions from tanks controlled by and exempted from the TNRCC's current rules. These emission totals would be reduced by implementing the suggestions of Items (1)- (5) as given in EPA's ACT. The revised total adjustments (E_{ADJ}) to reflect EPA's suggested level of control are determined by totaling the differences between the TNRCC and EPA control levels for Items (1) -(5) and are as follows:

♦ BPA 2.95 + 83.45 + 42.41 + 7.53 + 0.05 + 0.0 = 136.39 TPY

♦ HGA 272.41 + 44.00 + 55.50 + 8.41 + 60.67 + 4.88 = 445.87 TPY

Therefore, if the suggested controls of the storage tank ACT were implemented, the revised total emissions in BPA and HGA would be E_{EI} - E_{ADJ} = E_{ACT}, as summarized below:

♦ BPA 6881.43 - 136.39 = 6745.04 TPY

♦ HGA 12,358.39 - 445.87 = 11,912.52 TPY

For each nonattainment area, if the ACT limits constituted RACT then the 5% rule can be used if E_{EI} is less than (1.05) E_{ACT}. A comparison of E_{EI} to (1.05) x (E_{ACT}) is as follows:

Area	**Post-control Emissions (E_{EI}) (TPY)**	**Post-control Emissions (E_{ACT}) (TPY)**	**(1.05) x (E_{ACT}) (TPY)**
BPA	6881.43	6745.04	7082.29
HGA	12,358.39	11,912.52	12,508.15

Since E_{EI} is less than (1.05) x (E_{ACT}) for BPA and HGA, the TNRCC's existing storage tank rules represent RACT for these areas if the ACT is RACT.

Additional control requirements may be necessary in the future to achieve attainment with the ozone standard. The TNRCC will retain improved storage tank requirements as a potential future control measure.

Synthetic Chemical Manufacturing Industry (SOCMI) Batch Processes

Existing rules (§§115.121-115.129) for general vent gas streams which require 90% control of individual vents are in place for all nonattainment counties. The rules control all vent gas streams except those with emissions less than 100 pounds per 24-hour period or less than 612 parts per million by volume (ppmv).

EPA has issued an ACT document for SOCMI batch processes which applies to Standard Industrial Classification (SIC) codes 2821, 2833, 2834, 2861, 2865, 2869, and 2879. A search for these SIC codes was conducted in the EI. No major sources were identified in EP. One major source (Styrochem International, formerly Scott Polymers) was identified in DFW. This facility holds TNRCC Air Permit No. 3069A and therefore has undergone a Best Available Control Technology (BACT) review, which represents at least RACT. VOC emissions from this polystyrene bead manufacturing facility are controlled by use of a flare and a thermal oxidizer. Permit No. 3069A requires that the flare comply with 40 CFR 60.18 and that the thermal oxidizer maintain a destruction efficiency of 95%. Stack testing of the thermal oxidizer on December 21-22, 1993 revealed that the destruction efficiency was 98.2%. The controls required by Permit No. 3069A insure that RACT or better is applied at this source.

A variety of major sources were identified in BPA and HGA. The ACT suggests a minimum control efficiency of 90% for aggregated vents. The Mass Emission Curves (presented in Appendix F of the ACT) which form the basis for EPA's suggested applicability criteria consider concentrations of 1,000 to 37,000 ppmv. As noted above, the TNRCC's existing general vent gas rule has a 612 ppmv exemption level. However, the ACT suggests that individual vents be analyzed for possible combining into an aggregate vent gas stream. While the TNRCC notes that implementation of the ACT's suggested control options might result in control of additional vent gas streams, the TNRCC does not believe that such control would necessarily represent RACT. The ACT is predicated on all SOCMI batch process stream vents being uncontrolled initially. Existing control devices are not likely to have the capacity for handling anything more than a relatively minor increase in loading; consequently, companies would either have to replace the existing control device with a larger control device or add another control device in parallel with the existing control device. The ACT fails to take into account the fact that the associated incremental costs (in dollars per ton of VOC controlled) are much higher than the cost associated with the installation of the existing controls. Therefore, upgrading the control system is generally not considered to be cost-effective except in special circumstances (for example, when replacement or reconstruction of the control device is necessary for other reasons such as a concurrent plant expansion or when a control device has outlived its useful lifespan).

The ACT also fails to take into account the varying distances between vents; the cost increases as the distance between vents and the control device increases. In addition, the flow rate, concentration, temperature, etc. of batch processes are by definition not steady-state. As a result, each control device must be sized in order to handle the maximum flow rate and concentration, resulting in an oversized control device most if not all of the time. Consequently, the addition of a control device to a batch process vent gas stream is more costly (in dollars per ton of VOC controlled) than the cost of controlling a similar steady-state vent gas stream.

Furthermore, the ACT suggests that combined vents from a batch process train which have an annual mass emission total of 10,000 pounds per year or less be exempted from the control requirements. The ACT's Table 6-1, Summary of Control Option Regression Line Data, presents the regression line and data points obtained from the Appendix F graphs for various control levels. However, if the suggested 10,000 pounds per year rate is inserted into any of the regression line equations of Table 6-1, the equations give a negative flow rate. This is also true if a flow rate greater than the suggested exemption level (for example, 10,100 pounds per year) is inserted into any of these regression line equations. Evidently, an important part of the

ACT is inherently flawed, and therefore this ACT cannot be relied upon as the basis for RACT. Finally, it should also be noted that EPA has previously evaluated the TNRCC's existing general vent gas rule and determined that this rule represents RACT. In summary, additional controls on batch process vent gas streams based upon the ACT are not appropriate at this time.

Summary:

- BPA -- Current rules represent RACT.

- DFW -- One major source; current rules and BACT permit requirements represent RACT.

- EP -- No major sources; current rules represent RACT.

- HGA -- Current rules represent RACT.

SOCMI Reactor/Distillation

On November 10, 1993, TNRCC adopted rules (§§115.121-115.129) for SOCMI reactor processes and distillation operations in all nonattainment counties. This is the only post-1990 CAAA CTG that EPA has finalized to date. The TNRCC rules are essentially equivalent to the CTG's recommended level of RACT.

Summary:

♦ BPA Existing SOCMI vent gas rules represent RACT.

♦ DFW Existing SOCMI vent gas rules represent RACT.

♦ ELP Existing SOCMI vent gas rules represent RACT.

♦ HGA Existing SOCMI vent gas rules represent RACT.

Bakeries

TNRCC has adopted rules (§§115.121-115.129) for bakeries in DFW, ELP, and HGA. No major source bakeries were identified in BPA and ELP through a search of the EI and information from the American Bakers Association (ABA). EPA has issued an ACT document for bakeries and believes that the TNRCC rule does not constitute RACT for major sources because the level of control required is only 30%. EPA is not disputing the level of control for non-major sources.

The affected major source bakeries in DFW and HGA are required by §115.126(a)(4) to submit a specific control plan by May 31, 1995; §115.126(a)(4) also states that all representations are enforceable conditions. Major source bakeries identified in the 1990 EI include Mrs. Baird's in Fort Worth; and Apple Tree, Mrs. Baird's, Campbell Taggert, and Flowers Industries in Houston. Apple Tree has since shut down.

Initial control plans for Flowers Industries and the two Mrs. Baird's plants specify that add-on controls which reduce VOC emissions by at least 90% will be installed on all ovens and will be operational by May 31, 1996. Also, both Mrs. Baird's plants are mandated by permit to install add-on controls on all oven vents. Campbell Taggert's control plan indicates that they will install a catalytic oxidizer on their three largest ovens which will reduce VOC emissions by at least 90% from those ovens. The fourth oven (the cornbread oven) will not be controlled, but the facility will still achieve at least an 80% overall control of VOC emissions through control of the other three ovens.

Summary:

♦ BPA No major sources identified.

♦ DFW Existing rules; the only major source bakery (Mrs. Baird's in Ft Worth) will route all bread ovens to a control device (at least 90% efficient); consequently, RACT is in place for major source bakeries in DFW.

♦ ELP No major sources identified; existing rules.

♦ HGA Existing rules; of the four major source bakeries, one (Apple Tree) is shut down. Mrs. Baird's and Flowers Industries will install add-on controls (at least 90% efficient) on all oven vents. Campbell Taggert will control the largest three of their four ovens and will achieve an 80% overall reduction; consequently, RACT is in place for major source bakeries in HGA.

Industrial Wastewater

The TNRCC has adopted rules (§§115.140-115.149) for industrial wastewater in DFW, EP, and HGA. These rules are currently only a contingency measure in BPA. It should be noted that the draft CTG for industrial wastewater confines its recommendations to only four categories of industries: 1) organic chemicals, plastics, and synthetic fibers (OCPSF); 2) pharmaceuticals; 3) pesticides manufacturing; and 4) hazardous waste treatment, storage, and disposal facilities (TSDF). The draft CTG contains information on two additional categories: petroleum refining, and pulp and paper, but does not recommend RACT for those industries due to the MACT standards for Hazardous Air Pollutants (HAPs) that will address them. It was EPA's opinion that within these two industries, the wastewater streams that contain non-HAP VOCs also contain a substantial amount of HAPs. The EPA concluded that the MACT standards for petroleum refining and pulp and paper will substantially reduce VOC emissions, and the recommended RACT outlined in the draft CTG was not suggested for these industries. Any industrial wastewater sources not specifically included in the draft CTG or in separate MACT standards were evidently excluded because EPA considered "no control" to represent an acceptable level of RACT for these sources.

For BPA, the rule for industrial wastewater is currently a contingency rule; however, industrial wastewater VOC emissions will be controlled under federal requirements for control of HAPs. The Hazardous Organic National Emission Standards for Hazardous Air Pollutants (NESHAP) for SOCMI facilities, known as the SOCMI HON, will require control of HAPs in wastewater streams at SOCMI plants, and the Petroleum Refinery MACT will require control of benzene in refinery wastewater streams. Based upon a search of the EI for Source Classification Code (SCC) 3-01-820-01 through 3-01-820-11, 3-06-005-03 through 3-06-005-06, and 3-06-005-14 through 3-06-005-22, these two industrial classifications (SOCMI and refineries) encompass all the major sources of industrial wastewater in BPA.

Two SOCMI facilities were identified in BPA and must be in compliance with the SOCMI HON by April 1997. The HON implementation plans from these two facilities (because they chose to use emissions averaging for compliance) were submitted directly to the EPA Region 6 office in October 1995. These plans would be expected to indicate that the majority of the VOC wastewater emissions at these plants are being controlled through the HON. Refineries are the other four major industrial wastewater sources identified in BPA and account for 90% of the industrial wastewater emissions. These refineries (a category not targeted by the draft CTG) are subject to the Benzene NESHAP Subpart FF for wastewater and the Petroleum Refinery MACT. The EPA Office of Air Quality Planning and Standards (OAQPS) lead for the Petroleum Refinery MACT, Mr. Jim Durham, explained that in the case of a refinery, the primary wastewater stream constituents are BTEX (benzene, toluene, ethylbenzene and xylene). Because these compounds usually occur together, the MACT requirement to control benzene is believed to be adequate to effect control of all BTEX emissions, and therefore, most of the HAP emissions. Furthermore, according to Mr. Durham, the available information indicates that MACT control requirements are adequate to control most refinery wastewater VOC emissions.

For HGA, the existing TNRCC industrial wastewater rule targets the same industrial categories as those recommended by the draft CTG. The TNRCC conducted a search of the 1990 point source data base (PSDB) for the following SCC codes: 3-01-820-01 through -11; 3-06-005-03 through -06; and -14 through -22. The search yielded facilities in two of the industrial categories targeted by the draft CTG: one facility in pesticide manufacturing, and 47 facilities in OCPSF.

The one facility classified as a pesticide manufacturer reported wastewater emissions of only 4.1 TPY. At this insignificant level of emissions, no control is considered RACT. The facilities classified as OCPSF fell into three groups: plastics materials, synthetic resins, and nonvulcanizable elastomers (SIC 2821); cyclic crudes and cyclic intermediates, dyes and organic pigments (SIC 2865), and industrial organic chemicals, not elsewhere classified (SIC 2869). Of these facilities, the majority (24) reported wastewater emissions less than 1 TPY. Many of the 47 facilities, and all 12 of the facilities that reported wastewater emissions in excess of 11 TPY, have indicated they are subject to, and plan to comply with, Subpart G of the SOCMI HON. These plans, due to be submitted to EPA by April 22, 1996, would be expected to indicate that the majority of the VOC wastewater emissions from these plants are being controlled through the HON.

The control technology recommended under the HON, steam stripping, is the same as that recommended by the draft CTG. The TNRCC believes that the SOCMI HON will control wastewater streams to RACT levels, as most streams within a SOCMI facility are expected to contain HAPs and therefore fall under HON applicability. A demonstration of this should be possible once these facilities have completed the detailed studies of their wastewater streams required before they submit their SOCMI HON implementation plans. Most, if not all, of the SOCMI facilities in HGA are opting not to use emissions averaging for compliance; implementation plans for these facilities are due to EPA on April 22, 1996.

EPA noted in the draft CTG that its intent was to publish the CTGs on the same schedule as the MACT standards, so that owners and operators would have a knowledge of both sets of requirements as they develop their control strategies. Facility owners and operators are now already well into planning and budgeting for SOCMI HON compliance, in order to submit SOCMI HON implementation plans to EPA by April 22, 1996. Requiring additional controls, after facilities have budgeted for and installed controls to comply with the HON, would not be economically reasonable.

Summary:

♦ BPA Six major sources of industrial wastewater; SOCMI HON and Refinery MACT controls all VOCs effectively enought to constitute RACT. TNRCC wastewater rule is a contingency measure.

♦ DFW No major sources identified; existing rules.

♦ EP No major sources identified; existing rules.

♦ HGA TNRCC wastewater rules in place.

Cleanup Solvents

The TNRCC has not adopted specific rules for cleanup solvents (other than for cleanup solvents used in offset printing). TNRCC Chapter 115 includes RACT rules for cold solvent cleaning and vapor degreasing. EPA's ACT document for cleanup solvents suggests the implementation of a solvent accounting system (tracking the use, fate, and cost of all cleaning solvents) and a solvent management system (evaluation of material balances to identify the cleaning activities with the highest emissions, evaluation of alternative cleaning solutions, and experimentation to minimize the solvent needed for particular jobs).

The TNRCC believes that the Occupational Safety and Health Administration (OSHA) requirements of the Hazardous Communication Standard (29 CFR, 1910.1200) achieve VOC emission reductions equivalent to those expected if the ACT recommendations were implemented. The objective of the OSHA rule is to minimize worker exposure to hazardous chemicals; a term defined so broadly as to include those chemicals capable of causing rash or irritation, or which are flammable. This definition includes most, if not all, VOCs. Similar to the ACT, the OSHA rule requires no controls, but implements programs that improve employee awareness, which in turn, is expected to result in management level actions taken to reduce the use of hazardous chemicals (and therefore VOCs).

In addition, the TNRCC conducted a search of the EI for all the SCC codes associated with solvent cleaning (excluding cold solvent cleaning and vapor degreasing): 4-02-011-05, 4-02-013-05, 4-02-014-02 and -05, 4-02-015-02 and -05, 4-02-016-02 and -05, 4-02-017-02 and -05, 4-02-018-05, 4-02-020-02 and -05, 4-02-021-05, 4-02-022-02 and -05, 4-02-023-02 and -05, 4-02-024-02 and -05, 4-02-025-02 and -05, 4-02-026-02 and -05, 4-05-004-13 and -14, and 4-05-005-14. No cleanup solvent emissions were identified in BPA or ELP under these SCCs. Consequently, RACT rules for cleanup solvents do not need to be added in BPA or ELP. However, cleanup solvent emissions were reported at nine accounts in DFW and seven accounts in HGA.

An in-depth review of the EIs for the DFW accounts revealed that six of the nine identified accounts in DFW are not major sources. Because the total account emissions at these six facilities are less than the DFW major source definition of 100 tons per year, the "uncontrolled emissions" are also less than the major source threshold. A review of the EIs for the three DFW accounts which are major sources revealed that nearly all of the emissions are from surface coating operations which are regulated by RACT rules. At two of the facilities, the emissions classified as "cleanup solvent emissions" are actually associated with cold solvent cleaners which have emissions of less than 1.0 ton per year each. These cold solvent cleaners are regulated under Chapter 115 RACT rules, and the total "uncontrolled emissions" at these two accounts are less than the major source threshold. At all three major source accounts identified in DFW, cleanup solvent emissions are regulated by the RACT surface coating rules which include the requirement that "all VOC emissions from non-exempt solvent washings shall be included in determination of compliance with the emission limitations... unless the solvent is directed into containers that prevent evaporation into the atmosphere." Consequently, RACT rules for cleanup solvents do not need to be added in DFW.

An in-depth review of the EIs for the HGA accounts revealed that two of the seven identified accounts in HGA are not major sources. Because the total account emissions at these two facilities are less than the HGA major source definition of 25 tons per year, the "uncontrolled emissions" are also less than the major source threshold. A review of the EIs for the five HGA accounts which are major sources revealed that at one of the facilities, the emissions classified as "cleanup solvent emissions" are actually freon (non-VOC) emissions. At the other four accounts, the cleanup solvent emissions are actually surface coating operations which are regulated by the RACT surface coating rules. Consequently, RACT rules for cleanup solvents do not need to be added in HGA.

Summary:

♦ BPA No major sources identified; no rules adopted

♦ DFW Three major sources identified; cleanup solvent emissions regulated by RACT surface coating rules; no rules adopted.

♦ EP No major sources identified; no rules adopted.

♦ HGA Five major sources identified; cleanup solvent emissions are from non-VOCs or are regulated by RACT surface coating rules; no rules adopted.

<u>Autobody Refinishing</u>

The TNRCC has adopted rules (§§115.421-115.429) for automobile refinishing in DFW, EP, and HGA. EPA has expressed its intention to develop a national rule for auto refinishing; the national rule will insure that affected sources in all counties are controlled.

A search of the BPA, DFW, EP, and HGA EIs was conducted on SIC 7532 (top and body repair paint and paint shops), 5511 (new and used car dealers), and 5521 (used car dealers). (No SCC exists which is specific to auto body shops). No major source autobody shops were identified in any nonattainment area.

Summary:

- ♦ BPA No major sources identified; no rules adopted.

- ♦ DFW No major sources identified; autobody refinishing rules in place.

- ♦ EP No major sources identified; autobody refinishing rules in place.

- ♦ HGA No major sources identified; autobody refinishing rules in place.

Aerospace Coatings and Solvents

The TNRCC has existing rules (§§115.421-115.429) for coating of miscellaneous metal parts and products in all nonattainment counties. However, topcoating of the exterior of fully assembled aircraft is currently exempt.

A search of the EI was conducted on SIC 3721 (aircraft) and SCC 4-02-024-06 (surface coating of large aircraft -- topcoat). No major sources were identified in BPA, EP, and HGA.

Topcoating of assembled aircraft occurs in DFW at Lockheed (formerly General Dynamics) and Bell Helicopter. Vought Aircraft (formerly LTV) paints subassemblies only. Lockheed's topcoating of assembled aircraft is subject to an Alternate Reasonably Available Control Technology (ARACT) determination which establishes VOC coating limits and coating application standards. Bell Helicopter has applied for a similar ARACT which is currently being reviewed and, when finalized, will insure that RACT is applied.

In addition, a future MACT standard for aerospace coatings will regulate transfer efficiency and the topcoating of assembled aircraft. The EPA OAQPS lead for the Aerospace Industries MACT, Vickie Boothe, explained that VOCs will be used as surrogates for HAPs. Because the MACT will regulate both HAPs and VOCs, it will be adequate to insure that affected sources in all areas are controlled.

Summary:

♦ BPA No major sources identified.

♦ DFW Existing rules cover most operations; topcoating of assembled aircraft at major sources is regulated by ARACTs which insure that RACT is applied. MACT will also be adequate to insure that RACT is applied.

♦ EP No major sources identified.

♦ HGA No major sources identified.

Shipbuilding & Repair

The TNRCC has existing surface coating rules (§§115.421-115.429) in all nonattainment counties. Topcoating of fully assembled marine vessels and fixed offshore structures is currently exempted by the state rules; however, a future MACT standard will limit emissions of both HAPs and VOCs in marine surface coating operations. As is stated in the Shipbuilding and Ship Repair MACT preamble, due to the poor quality of HAP content data on the Material Safety Data Sheets (MSDSs) and the lack of an approved test method for speciating and quantifying HAP, the EPA has determined that VOC will be used as a surrogate to limit HAP emissions. Because the MACT will regulate both HAPs and VOCs, it will be adequate to insure that affected sources in all areas
are controlled.

A search in the BPA, DFW, EP, and HGA EIs was conducted on SIC 3731 (ship building and repairing) and SCC 4-02-023-01, -02, -03, -04, -05, -06, and -99 (surface coating of large ships). No major sources were identified in BPA, DFW, and EP. Two facilities were identified in HGA: Platzer Shipyards (≥39 TPY from ship coating out of 166 TPY total), and Newpark Shipbuilding (39.4 TPY from ship coating out of 48.5 TPY total).

Summary:

♦ BPA No major sources.

♦ DFW No major sources.

♦ ELP No major sources.

♦ HGA Two sources identified; MACT will regulate both HAPs and VOCs and will be adequate to ensure that RACT is applied.

Wood Furniture

TNRCC has adopted rules (§§115.421-115.429) for wood parts and products coatings in DFW, EP, and HGA. No rules have been adopted for BPA. A search of major sources in the EI was conducted on SIC 2434 (kitchen cabinets), 2511 (wood household furniture), 2512 (upholstered wood furniture), 2517 (wood TV and radio cabinets), 2519 (household furniture, nec), 2521 (wood office furniture), 2531 (public building and related furniture), 2541 (wood partitions and fixtures), and 2599 (furniture & fixtures, nec); and SCC 4-02-019-01, -03, -04, and -99 (surface coating of wood furniture). No major sources were identified in BPA, EP, and HGA. Two major sources were identified in DFW: Triangle Pacific, and Texwood Industries.

A future MACT standard for wood furniture is being developed through a regulation negotiation ("reg-neg") with representatives of the wood furniture manufacturing industry, the coatings industry, environmental organizations, and state agencies. The MACT is expected to have more stringent VOC coating limits than the existing TNRCC rules. Existing sources with at least 50 TPY of HAP emissions would be required to comply with the MACT standards by November 15, 1997, and reductions in HAP emissions are expected to be at least 59%.

EPA is concurrently developing a CTG, also through the reg-neg process, which will establish RACT for the wood furniture manufacturing industry. Therefore, the TNRCC believes that it would be prudent to postpone any potential additional state rulemaking on the wood furniture manufacturing industry until EPA finalizes the CTG. Any differences between the TNRCC's current rule and the forthcoming CTG can be evaluated at that time.

Summary:

- ♦ BPA No major sources.

- ♦ DFW Two major sources identified; existing rules in place; any differences between the TNRCC's current rules and EPA's RACT recommendations will be identified once EPA finalizes the forthcoming CTG.

- ♦ EP No major sources.

- ♦ HGA No major sources.

Plastic Parts Coating

TNRCC has existing surface coating rules (§§115.421-115.429) in all nonattainment counties. However, surface coating of plastic parts is currently unregulated.

A search of major sources was conducted in the BPA, DFW, EP, and HGA EIs on SIC 3079 and 3089 (plastic products, nec); and SCC 4-02-022-01, -02, -03, -04, -05, and -99. No major sources were found in BPA and EP. In DFW, plastic parts coating is performed at two major sources: Peterbilt (Denton County) and Nash Manufacturing (Tarrant County). Since the 1990 EI, Peterbilt installed a thermal oxidizer on their painting operations (including the plastic parts coating operations) to meet permit requirements and, therefore, has RACT controls on their plastic parts coating operations.

At Nash Manufacturing, the VOC emissions from the coating of plastic skis are limited by Standard Exemption 75 to 25 TPY, although total facility emissions exceed 100 TPY. EPA's ACT for plastic parts only covers the surface coating of automotive/ transportation and business machine plastic parts. The coating of plastic skis does not fall into either of these categories and, therefore, is a non-CTG category. According to EPA's Issues Relating To VOC Regulation Cutpoints, Deficiencies, And Deviations, a non-CTG major source is based on the plantwide emissions total from "nonregulated sources," which includes sources which would have been covered by a CTG if they had been above the EPA-accepted size cutoff, but excludes regulated CTG sources. Under this, if cost-effective, RACT may be required for equipment units which are individually less than a major source, if they are located at a plant with aggregate "nonregulated" major emissions. In Nash's case, the "nonregulated" emissions are limited to 25 TPY, which does not constitute a major source in DFW. Consequently, a RACT rule for Nash's plastic parts coating operation is not needed.

In 1990 in HGA, plastic parts coating was performed at one major source: Performance Plastics (Harris County). However, total VOC emissions for the facility in 1993 are only 19.8 TPY, and the emissions associated with coating of plastic parts comprise only 2 TPY out of the total of 19.8 TPY. Further file review revealed that the largest emission source, the curing oven, is limited by permit to 18.04 TPY of VOC.

On April 19, 1994, the company submitted Form PI-8 (Special Certification Form for Standard Exemptions §116.213) for both of their paint booths which establish federally enforceable allowable emission rates of 0.97 TPY each. Therefore, Performance Plastics no longer has the potential to be a major source, and consequently a RACT rule is not needed.

Summary:

♦ BPA No major sources.

♦ DFW One major source (Peterbilt) equipped with permit-required add-on controls which represent RACT.

♦ EP No major sources.

♦ HGA No major sources.

Offset Printing

The TNRCC has adopted rules (§§115.442-115.449) for offset printing in DFW, EP, and HGA. These rules are mandatory for EP and are contingency measures for DFW and HGA. No rules have been adopted for BPA.

A search of major sources was conducted in the BPA, DFW, EP, and HGA EIs on SIC 2751 (printing), 2752 (commercial printing, lithographic), and 2759 (commercial printing, nec); and SCC 4-05-002-01, -11, -12, and 4-05-004-01, -11, -12, and -13. No major sources were found in any nonattainment area.

Summary:

♦ BPA No major sources.

♦ DFW No major sources; offset printing is a contingency measure.

♦ EP No major sources; existing rules in place.

♦ HGA No major sources; offset printing is a contingency measure.

Petroleum Dry Cleaners

The TNRCC has adopted rules (§§115.552-115.559) for petroleum dry cleaners in DFW, EP, and HGA. These rules are contingency measures for these three areas; no rules have been adopted for BPA.

A search of major sources was conducted in the BPA, DFW, EP, and HGA EIs on SIC 7216 (dry cleaning plants, except rug) and 7218 (industrial launderers); and SCC 4-01-001-02, -04. and -98. No major sources were found in the EI for any nonattainment area.

During the development of the petroleum dry cleaner rule, TNRCC sent out an industry survey to gather information on VOC emissions. The survey was sent to the dry cleaning trade associations to be distributed to their members. The agency received no responses. Dry cleaning solvent sales information provided by a major vendor suggested the possibility of two major source petroleum dry cleaners in the HGA nonattainment area. The vendor, however, would not identify the establishments, and there is no way to determine which dry cleaners these might be.

In addition, it can not be assumed that the total amount of solvent purchased by a particular facility is used entirely at that location or within a given time period. These establishments may be distributing a portion of their purchased solvent to other branch facilities or stockpiling for use in the distant future. Furthermore, solvent sales data cannot be equated with solvent emissions because adjustments must be made to account for operational losses (as high as 20%) through waste (wastewater and filter) disposal practices.

Summary:

- ♦ BPA No major sources.
- ♦ DFW No major sources; petroleum dry cleaning is a contingency measure.
- ♦ EP No major sources; petroleum dry cleaning is a contingency measure.
- ♦ HGA No major sources; petroleum dry cleaning is a contingency measure.

Marine Vessel Loading

On September 19, 1995, EPA published final standards for marine vessel loading in the Federal Register (pages 48388-48417). These standards included MACT requirements for air toxics under §112 of the FCAA, as well as RACT requirements under §183(f) of the FCAA. EPA's promulgation of marine vessel loading RACT under §183(f) establishes what EPA considers to be the minimum requirements for marine vessel loading under §182(b)(2)(C). The EPA's actions under §183(f) satisfy the marine vessel loading RACT requirements without any further action necessary on the state's part.

A search of the EI was conducted on SCC 4-06-002-31 through 4-06-002-40, 4-06-002-43 through 4-06-002-46, 4-06-002-48 through 4-06-002-51, 4-06-002-98, 4-06-002-99, and 4-08-999-97. No marine vessel loading operations are located in DFW and EP. Major sources were identified in BPA and HGA and will be discussed separately.

The TNRCC has adopted rules (§§115.211-115.219) for marine vessel loading in HGA. These rules are a contingency measure in BPA. The TNRCC's rules for marine vessel loading in HGA exempt marine terminals with emissions less than 100 TPY. At issue is whether the 100 TPY exemption is appropriate, given that a major source is 25 TPY.

Comparison using the "5% rule." The 5% rule provides a mechanism for states to justify exemptions or cutpoints which are more lenient than EPA's RACT baseline. It is applied by determining the total emissions allowed by EPA's RACT baseline (including exemptions) and comparing this to the emissions allowed (including exemptions) by a state regulation. If the difference is less than 5%, EPA considers that there is no substantive difference between state and EPA requirements. The 5% justification for each rule category must be applied separately to each nonattainment area. A summary of emissions for HGA is as follows:

Company	Acct. No.	Pre-control Emissions	Post-control Emissions (EPA)*	Post-control Emissions (TNRCC)**
Amerada Hess	HG-0017-W	129.0	25.8	12.9
Amoco	GB-0004-L	927.6	185.5	92.8
Aristech Chemical	HG-1249-P	0.1	0.1	0.1
Celanese	HG-0127-O	5.4	5.4	5.4
Crown Central Petr	HG-0175-D	45.3	9.1	45.3
Dow Chemical	BL-0022-M	114.5	22.9	11.5
Dow Chemical	BL-0082-R	0.2	0.2	0.2
Exxon USA	HG-0232-Q	1149.9	230.0	115.0
Galveston Terminals	GB-0119-Q	0.6	0.6	0.6
GATX	HG-0261-J	890.7	178.1	89.1
GATX	HG-0262-H	1432.2	286.4	143.2
Haltermann	HG-0391-D	0.7	0.7	0.7
Houston Fuel Oil	HG-0345-C	0.3	0.3	0.3
Intercontinental	HG-0403-N	261.0	52.2	26.1
Lyondell Citgo	HG-0048-L	55.9	11.2	55.9
Marathon Oil	GB-0055-R	125.8	25.2	12.6
Oxy	BL-0113-I	175.8	35.2	17.6
Paktank	HG-0542-V	0.8	0.8	0.8
Paktank	HG-0629-I	124.4	24.9	12.4
Petro United	HG-0029-P	80.6	16.1	80.6
Phibro	GB-0073-P	120.2	24.0	12.0
Phibro	HG-0130-C	44.0	8.8	44.0
Phillips Petroleum	BL-0041-I	299.7	59.9	30.0
Rhone Poulenc	HG-0696-Q	2.2	2.2	2.2
Shell Chemical	HG-0659-W	548.3	109.7	54.8

Stan Trans Inc.	GB-0005-J	0.1	0.1	0.1
Tenneco	HG-0714-Q	319.8	64.2	32.0
Texas Petrochemicals	HG-0562-P	226.9	45.4	22.7
Union Carbide	GB-0077-H	28.5	5.7	28.5
Warren Petroleum	HG-0786-O	2136.4	427.3	213.6
TOTAL		9246.9 TPY	1858.0 TPY	1163.0 TPY

* Based upon 80% overall control for non-CTG major sources. (Precedent for this control level has been established in surface coating as well as EPA’s minimum acceptable control level for major source bakeries).

** Based upon 90% overall control as required by §115.211(a)(3).

Since 1163.0 TPY (reductions from the TNRCC's rule) is less than (1.05)(1858.0) (reductions from EPA's RACT baseline), the TNRCC's existing marine vessel loading rules represents RACT in HGA.

The marine vessel loading rule was initially adopted as a contingency rule for BPA on January 4, 1995 and can be implemented if the BPA area fails to attain the national ambient air quality standard for ozone by the attainment deadline (currently November 15, 1999); if the BPA area fails to demonstrate reasonable further progress as set forth in the 1990 Amendments to the FCAA, §172(c)(9); if EPA denies a petition to redesignate BPA as an ozone attainment area; or if EPA denies approval of the demonstration of attainment for BPA based upon UAM modeling.

BPA is currently classified as a serious ozone nonattainment area, but the TNRCC has petitioned EPA to reclassify this area as a moderate nonattainment area. If BPA is successfully reclassified as a moderate area, the RACT requirement for major sources will still continue to apply. However, the TNRCC's ultimate intention is to petition EPA to redesignate BPA as an attainment area based upon actual monitoring data or upon modeling using UAM modeling. If BPA can be successfully re- designated as an attainment area, EPA has indicated pre- liminarily that marine vessel loading could remain a contingency rule.

Summary:

- BPA -- Marine vessel loading is a contingency measure to be implemented if necessary; EPA's final standards for marine vessel loading published in the Federal Register on September 19, 1995 establish RACT requirements under §183(f) of the FCAA.

- DFW -- No sources; no current rule.

- EP -- No sources; no current rule.

- HGA -- Current rules represent RACT; EPA's final standards for marine vessel loading published in the Federal Register on September 19, 1995 establish RACT requirements under §183(f) of the FCAA.

(ii) Federal Rules and Other Federal and State Programs

According to §108(b)(1) of the FCAA Amendments of 1990, the EPA Administrator shall issue to the states and appropriate air pollution control agencies information on air pollution control. Sections 182(b)(1)(C) and (D) of the FCAA specify in general terms which emissions reductions are creditable toward the ROP reduction requirements and which are not. Section 182(b)(1)(D) does not specifically limit the creditability of emissions reductions associated with the programs discussed in this section toward the ROP requirements; therefore, emissions reductions associated with the programs listed below are generally creditable. However, some additional limitations do exist to the extent that emissions reductions associated with the programs listed below must be quantifiable, real, enforceable, replicable, accountable, and occur between November 15, 1990 and November 15, 1999. The federal programs listed below are generally creditable, provided they meet these limitations. Additionally, some state programs may be creditable provided they meet these limitations.

--Control Technique Guidelines

--Benzene National Emissions Standards for Hazardous Air Pollutants

--Treatment, Storage, and Disposal Facilities

--Hazardous Air Pollutant Standards

--New Source Performance Standards

--Controls required for mobile sources

In general, in order to take ROP SIP emission reduction credit, emission limits must be established by rule before the SIP submittal deadline. The EPA has allowed states to claim ROP credit on a limited basis without preemptive rulemaking. The TNRCC is pursuing this approach for the MACT standards and for the national engine rules. The 1990 CAAA preclude states from separate rulemaking for the engine categories. The following are federal programs for which the state has taken credit in either the 15% or the current SIP.

--Clean Fuel Fleet (FCAA Amendments)

--Aircraft Engines (Federal Aviation Administration Rule)

--Architectural Coatings

--Hazardous Organic National Emission Standards for Hazardous Air Pollutants (HON)

--Landfills subject to New Source Performance Standards

--Pulp and Paper Manufacture (MACT)

--Recreational Marine Vessels

--Waste Treatment, Storage, and Disposal Facilities (MACT)

The 1990 FCAA Amendments significantly changed the permitting process for new sources or modifications of existing sources. The most important changes are with respect to the application of rules requiring emissions offsets in nonattainment areas. The definition of "major source" also changed for certain nonattain-ment areas. In Texas, the major source definition is 50 TPY in the BPA area and 25 TPY in the HGA area. An additional impact of lowering the definition of major source in the nonattainment areas is the lower trigger for implementing the Lowest Achievable Emissions Rate (LAER) for new major sources or major modifications in accordance with the state construction permit rules in §116.150. Any reductions which do occur as a result of the 1990 FCAA Amendment's major source definition and offset requirements will be creditable towards the Post-96 reduction.

The offset requirement is managed by an "emissions banking" regulation. This allows industries to bank emissions they have made voluntarily (beyond those required by their TNRCC permit)
if those reductions can be verified. New or expanding industries which would not otherwise have been permitted to operate can take advantage of these banked emissions. Nonattainment areas can, therefore, still attract new or expanding industry while obtaining subsequent emissions decreases through the required offsets.

Under the banking system, industries which are capable of demonstrating a verifiable voluntary reduction in emissions may sell these banked emissions to new or expanding industries. The purchasing industry must prove a greater than one-to-one offset ratio. These offset ratios vary between nonattainment areas. For BPA, the offset ratio is 1.2 to 1, yielding a 20% net reduction. For HGA, it is 1.3 to 1, yielding a 30% net reduction.

Nonattainment areas may also take credit for permanent shutdowns of stationary sources within their airshed. The credits may not be double-counted as part of NSR, banking, or any other offset program. The shutdowns must occur between 1990 and 1999. Within this framework, an area may take credit for the entire emissions from the closed facility or operations.

Certain rules adopted as part of the 15% ROP SIP continue to gain creditable emission reductions either through equipment turnover or phasing in of more stringent requirements between 1997 and 1999. These reductions are being quantified, and include categories such as the following:

--Small Utility Engines

--Automobile Inspection/Maintenance

--Federal Motor Vehicle Control Program

--Federal Reid Vapor Pressure Control

--Employee Trip Reduction

--Underground Storage Tank Remediation

--Stage II Gasoline Vapor Recovery

(b) Extended Compliance Schedule (No Change.)

(c) Alternate Methods of Control (AMOC) (No Change.)

(d) Proposed New VOC Control Measures

(i) New or Modified Point Source Controls

The following rules were developed and submitted to EPA on January 11, 1995 to meet the 9% ROP requirements for the HGA and BPA nonattainment areas.

<u>Storage of Volatile Organic Compounds (§§115.112-115.119)</u>

The revisions add recordkeeping requirements for external floating roof storage tanks for all four ozone nonattainment areas. The purpose of the recordkeeping changes is to improve recordkeeping requirements for secondary seal gap exceedances and the associated emissions in order to improve rule effectiveness, resulting in additional emission reduction credits.

<u>Industrial Wastewater (§§115.140-115.149)</u>

The revisions establish the industrial wastewater control as a contingency measure for the BPA area to be implemented if the TNRCC determines that this contingency rule is necessary as a result of failure to attain the national ambient air quality standard for ozone by the November 15, 1999 attainment deadline or failure to demonstrate reasonable further progress as set forth in the 1990 Amendments to the FCAA, §172(c)(9).

<u>Marine Vessel Loading (§§115.211-115.219)</u>

The revisions establish marine vessel loading control requirements as a contingency measure for the BPA area to be implemented if EPA does not approve the attainment demonstration planned to be submitted in conjunction with the pending reclassification petition for the area.

(ii) New or Modified Area Source Controls

No area source controls were modified or proposed to meet the requirements of this SIP.

(2) Changes in Mobile Source Emissions

(a) Federal Motor Vehicle Control Program (No Change.)

(b) Federal Gasoline Volatility (Reid Vapor Pressure) Control Program (No Change.)

(c) Transportation Planning

Much of the responsibility for the planning and implementation of transportation control measures (TCMs) has been delegated to the nonattainment areas' local governments and metropolitan planning organizations (MPOs). TCMs are designed to either reduce the number of vehicles on the road, reduce the vehicle miles traveled, or improve the flow of traffic. There are a variety of TCMs being considered, and each nonattainment area will choose from among them. A new rule, 30 TAC §114.23, concerning TCM, has been adopted to provide enforceability to the TCM strategy selected for each area. The new rule contains TCM-specific definitions; designations of affected MPOs responsible for TCM development, funding, and implementation; requirements that MPOs submit specific information provided by agencies or entities responsible for implementation of TCMs and a quantification of the emission reduction benefits; requirements that MPOs maintain and provide specific information regarding TCM implementation status; requirements that the MPOs modify the transportation improvement plan for the area, as necessary, to correct implementation deficiencies; and prescribed enforcement actions to be taken if deficiencies remain unresolved or if knowing violations of TCM commitments occur. Eligible TCM's include the following:

--High Occupancy Vehicle Lanes. Restrict certain roads or lanes for passenger buses or high-occupancy vehicles, and programs for the provision of all forms of high-occupancy, shared-ride services.

--Trip-reduction ordinances.

--Traffic flow improvement programs that reduce emissions.

--Signal timing improvements and computer controlled signal coordination/progression permit vehicles travelling in the direction of the major traffic flow to receive a green light whenever possible, thereby reducing idling time. Intersections can also be modified to improve traffic flow and reduce emissions.

--Programs to limit or restrict vehicle use in the downtown area or other areas of high emission concentration, particularly during periods of peak use.

--Programs to limit portions of road surfaces or certain sections of the metropolitan area to bicycle or pedestrian use, and to construct new roads or paths for this purpose. Also programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the protection and convenience of bicyclists, in both public and private areas.

--Programs to reduce emissions due to extended idling of vehicles and extreme cold start conditions.

--Programs and ordinances to facilitate non-automobile travel, to facilitate provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events centers, and other centers of vehicle activity.

--Programs for improved public transit routes, service, frequency, and route modifications are also included. Other programs include reduced transit fare and municipal car pool/van pool programs.

--Programs to encourage the voluntary removal of pre-1980 model year light-duty vehicles and trucks from use and the marketplace.

--Programs and ordinances for parking incentives and disincentives to promote use of multi-occupancy vehicles or mass transit.

(d) Vehicle I/M Program

The 1990 FCAA Amendments mandate vehicle emissions I/M programs in areas that are classified as moderate and above for ozone or carbon monoxide. For new and existing I/M programs, Congress also set minimum I/M design requirements such as computerized oversight, test-only inspections, and registration enforcement.

EPA subsequently promulgated federal rules to specify performance standards for I/M programs. These rules, dated November 5, 1992, state what is expected by EPA. There are two types of performance standards. "Basic" programs are required for nonattainment areas with moderate ozone classifications and higher classified areas with a 1980 population of less than 200,000. "Enhanced" programs are required for those nonattainment areas with a 1980 population of 200,000 or more which are classified as having serious, severe, or extreme ozone pollution levels.

The centralized I/M program, originally implemented in January, 1995, was canceled by the state legislature in May, 1995, after strong public opposition. On November 10, 1995, the Governor released plans for a new program. This program will be proposed in a SIP revision in early 1996. The redesigned program will enable Texas to meet the requirements of the 15% ROP SIP.

(e) Accelerated Vehicle Retirement Rule

The purpose of the Accelerated Vehicle Retirement Program (AVRP or scrappage) is to reduce mobile source emissions of VOCs and NO_x, and provide additional flexibility for stationary sources in the following ozone nonattainment counties: Brazoria, Chambers, Collin, Dallas, Denton, El Paso, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, Tarrant, and Waller. A scrappage program reduces VOC, NO_x, and CO emissions from on-road mobile sources, by permanently removing high-emitting vehicles from the area-wide fleet. With this rule, stationary sources will have the opportunity to select the most cost-effective approach to comply with federal and state regulations for ozone reductions. The AVRP is a voluntary program for both the stationary source and the motorist.

The baseline tailpipe emissions for the scrappage vehicles are measured by an IM240 (high-tech) emission test. All participating scrappage vehicles are required to submit a vehicle emission certificate (VEC), with emissions recorded in grams per mile, at the time the vehicle is purchased by the scrappage sponsor. The VEC should be obtained at a referee facility. Evaporative emissions by model year, as estimated by the most recent version of the EPA MOBILE Model, are added to the vehicles tailpipe emissions, if the vehicle fails the purge/pressure test.

Most owners of scrappage vehicles will replace their vehicle with a newer vehicle with much lower emissions. The emissions for the replacement vehicle must be accounted for in the credit calculation. The replacement vehicle is equal to the average fleet vehicle for that ozone nonattainment area as calculated from the most current auto registrations and the most recent version of the EPA MOBILE Model.

The final component in the mobile emissions reduction credit calculation is annual vehicle miles traveled (VMT). Annual VMT is determined by subtracting last year's odometer reading from the odometer reading at the time the vehicle is tested. Annual VMT is extrapolated if the difference does not represent a full 12 months.

The emission reduction in grams per year for each scrappage vehicle equals tailpipe emissions plus evaporative emissions minus estimated emissions for the replacement vehicle multiplied by VMT. The emission reduction (grams per mile) obtained by each vehicle is converted to a mobile source emission reduction credit (MERC) expressed in tons per year. The MERC has a life of three years. It is discounted in year two and year three by 20% to account for vehicle attrition that would have occurred without the program.

The emission quantification methodology described above is replicated for each participating scrappage vehicle. The TNRCC Emissions Bank calculates the MERC value from the documentation provided by the scrappage dealer or sponsor. If the proper documentation is not provided, a vehicle could be disqualified by the Bank and excluded from the MERC calculation. This would result in a lower MERC value than the actual emission reduction achieved. The modeled data inputs for the MERC calculation are updated annually by the TNRCC.

The staff of the Emission Credit Trading Section (ECT) of the Office of Air Quality will enforce the AVRP. Scrappage Plans will be reviewed thoroughly so as to prevent a sponsor from mishandling vehicles, purchasing ineligible vehicles, or misinterpreting rule requirements. All documentation and MERC applications will be reviewed for completeness and accuracy. Each vehicle purchased must pass the eligibility criteria estab- lished by the rule, which will be determined by the documentation submitted with the MERC application. The TNRCC will randomly audit scrappage events to ensure compliance with the regulation. Scrapper certification will also be determined and enforced by ECT.

The ECT section will monitor, maintain records, and report on all scrappage activities through the TNRCC Emissions Bank. Copies of all the documentation required by the rule to verify residency, ownership, vehicle registration, emissions, the condition of the vehicle, and VMT will be on file at the TNRCC. The TNRCC will also keep records of any other documentation required to support the MERC calculation. The ECT staff will develop and maintain a data base of all scrappage vehicles and the credits generated. Annual reports of the AVRP activity will be issued to the EPA. The TNRCC has chosen to incorporate stricter requirements in the AVRP program than necessary to account for any program uncer-tainty, to assure an environmental benefit when trading MERCs, and prevent any backsliding. The attrition rate has been set at 20%, as recommended by the EPA, rather than a lower rate which would be justified by the longer life of vehicles in the south. There are environmental benefits built in to all the uses of MERCs. The offset ratio for each nonattainment area is applied when MERCs are used as offsets.

e) Emissions Tracking (No Change.)

f) Contingency Plan Requirements (No Change.)

g) Control Measure Catalog

The control measure catalog (CMC) continues to play an important role in control strategy development. Development of the CMC is taking place in several stages for use in the Texas Phased Attainment Demonstration (discussed in Appendix F). Appendix B contains a comprehensive list and description of potential control measures developed by TNRCC staff and subject to review by other interested parties. This set of "one pagers" is not a commitment to develop rules on any or all of the listed control measures. Rather, it is an attempt to begin researching and collecting the necessary information that will be used to complete the CMC later in the process. The following is a brief description of the criteria currently being considered to evaluate potential control measures.

Control Measure Catalog Ranking

♦ Cost effectiveness is the average cost to implement the control measure divided by the tons of VOC reduced. 40 points

$/ton	
0 - 1499	40
1500 - 1999	35
2000 - 2499	30
2500 - 2999	25
3000 - 4999	20
5000 - 9999	15
10000 - 12499	10
12500 - 15000	5
> 15000	0

♦ Emission reduction potential is the average value of tons of VOC reduced per day. It is determined by multiplying the control efficiency by the uncontrolled emissions, which results in controlled emissions. The difference between uncontrolled and controlled emissions is the total tons reduced. 10 points

TPD	
> 10.0	10.0
5.0 - 10.0	7.5
2.0 - 4.9	5.0
1.0 - 1.9	2.5
0.4 - 0.99	1.0

0 - 0.4	0

♦ Reactivity is a measure of the tendency of a VOC to enter into ozone forming reactions. This is based on a scale developed by William Carter (U.C. Riverside) as a result of a study conducted in California. 15 points

♦ Technical feasibility is a means to evaluate the availability of and dependability of control equipment or processes necessary to implement the control measure. 10 points

Off the shelf and used	10.0
Developed	7.5
Technology forcing	2.5
Theoretical	0

♦ Toxicity is determined using the threshold screening level. The actual breakdown is dependent on input from the Toxicology and Risk Assessment Section. 10 points

Highly toxic	10.0
Moderately toxic	7.5
Slightly toxic	5.0
Relatively nontoxic	2.5
Nontoxic	0

♦ Enforceability is evaluated based on four areas: recordkeeping, number of sources, percent of sources inspected annually, frequency of inspection. 15 points

Recordkeeping

continuous	5.0
< daily	4.0
daily	3.0
weekly	2.0
monthly or >	1.0
none	0

Number of sources

0 - 200	5.0
>200 - 2000	4.0
>2000 - 20000	2.5
>20000 - 200000	1.0
>200000	0

Frequency of inspection

> monthly	2.5
monthly - semi-annually	2.0
< semi-annually - annually	1.5
< annually	1.0
none	0

Percent of sources inspected annually

>75 - 100	2.5
>50 - 75	2.0
>25 - 50	1.0
>0 - 25	0

h) Committment to Consultative Process

The State of Texas commits to participating in a consultative process with EPA to address the role of transport in ozone nonattainment. Texas is committed to participation in EPA's consultative process and as part of this commitment has been participating in the Ozone Transport Assessment Group's (OTAG) review of ozone transport issues. Texas, along with some other states, is supporting participation in the OTAG process to focus on improved scientific understanding of the ozone transport problem as a prerequisite to consideration of control strategies, including full consideration of the costs involved. Texas does not believe the OTAG process should be used to gain support for predetermined control strategies or to shift the regulatory burden to other states. Therefore, we do not plan to commit to the results of the OTAG process to the extent they are not supported by a sound scientific basis.

b. Dallas/Ft Worth Ozone Control Strategy (No Change.)

c. El Paso Ozone Control Strategy (No Change.)

d. Beaumont/Port Arthur Ozone Control Strategy

1) General

a) Air Quality Analysis--Why These Reductions Are Needed

In December of 1990, then-Texas Governor William Clements requested that the Beaumont/Port Arthur area be reclassified as a "Moderate" ozone nonattainment area in accordance with Section 181(a)(4) of the 1990 CAAA. That request was denied on February 13, 1991. A recent review of the original request and supporting documentation has revealed that this denial was made in error. As provided by Section 110(k)(6) of the Act, the Administrator of the U.S. Environmental Protection Agency has the authority to reverse a decision regarding original designation if it is discovered that an error had been made.

Monitoring data from a privately-funded, special purpose monitoring network which was not included in the Aerometric Information Retrieval System database was improperly used to deny this request. Furthermore, subsequent air quality trends demonstrate that Beaumont/Port Arthur is more properly classified as a Moderate nonattainment area, and should attain the standard by the required date for Moderate areas of November 15, 1996. Therefore, Governor Bush sent a letter and technical support to EPA in July, 1995, requesting that the BPA area be reclassified to Moderate nonattainment status. BPA plans to demonstrate attainment one of the following ways:

♦ Monitored values showing attainment of the standard at state-operated monitors for the years 1994-1996, which is the timeline the 1990 CAAA specifies for Moderate areas.

♦ UAM modeling showing attainment of the standard but for transport of ozone and/or precursors.

2) Estimated Emissions Reductions

a) Stationary and Area Source Controls Toward 9% Reduction (No Change.)

b) Mobile Source Controls

(1) Vehicle Inspection/Maintenance Program

Senate Bill 178, passed by the 74th Texas Legislature, 1995, gives implementation responsibility for an interim Inspection and Maintenance program to the Texas Department of Public Safety and directs the TNRCC to adopt emergency rules to repeal conflicting requirements as soon as possible. On June 14, 1995 (published in the June 23, 1995, issue of the Texas Register (20 TexReg 4523)), the TNRCC adopted emergency rules that repealed §§114.3, 114.6, and 114.7, concerning Inspection Requirements, Hardship Eligibility Criteria, and Inspection and Maintenance Fees. In addition, the TNRCC adopted on an emergency basis a new §114.3, concerning Inspection Requirements.

The new §114.3 requires motorists to comply with air pollution emission control requirements included in the annual vehicle safety inspection program. The new section also requires that the rules and regulations adopted by DPS be completely and properly performed prior to the issuance of a vehicle inspection certificate. The old §114.6 established the hardship eligibility criteria. The DPS may now promulgate such standards. The old §114.7 set fees for inspections and fees associated with conducting tests. The DPS will now promulgate such standards. The Governor's office will negotiate the type of final I/M program, if any, to be implemented in the BPA area. Public hearings will be conducted prior to implementation of any program. A public information program will be conducted to advise motorists of the emissions testing program.

(2) Reformulated Gasoline and Clean Alternative Fuels

Reformulated Gasoline (RFG) is not being considered as a control measure for the general public in BPA.

Provisions of the FCAA Amendments of 1990 created the Federal Clean Fuel Fleet (FCFF) program. The program affects all private and public fleets with 10 or more vehicles in the serious, severe, and extreme nonattainment areas. The affected fleets are required to ensure that percentages of their purchases, starting in 1998, reach a minimum of the low-emission vehicle (LEV) standards using clean fuels (natural gas, propane, methanol, ethanol, electricity, RFG, hydrogen, and diesel). The FCFF program gave states the option of opting-out to implement a substitute program, provided that it demonstrates equivalent reductions to those resulting from the federal program. Texas chose to opt-out of the federal program to implement the Texas Alternative Fuel Fleet (TAFF) program, which was adopted by the TNRCC on July 6, 1994.

Senate Bill 200, passed by the 74th Texas Legislature in 1995, amended statutory alternative fuels requirements. SB200's changes will impact the TAFF program requirements. The agency is in the process of evaluating these impacts and intends to complete a rule and SIP revision by early 1996.

2) Estimated Emission Reductions (No Change.)

3) Evidence of Attainment (No Change.)

4) Contingency Plan (No Change.)

e. Houston/Galveston Ozone Control Strategy

1) General

a) Air Quality Analysis--Why These Reductions Are Needed (No Change.)

2) Estimated Emission Reductions

a) Stationary and Area Source Controls

b) Mobile Source Controls

(1) Transportation Control Measures

A TCM program is mandated for the HGA nonattainment area. Several measures are being considered for implementation in the area. These measures include: pedestrian improvements, traffic signal timing improvements, college traffic management, K-12 school traffic management, employee transit pass subsidy, non-metro service area transit, fixed commuter rail, bicycle improvements, trip reduction ordinances, ridesharing, parking management, telecommuting, flexible work hours, compressed work week, motorist information system, incident management, special events management, control of truck movements. Measures scheduled to be implemented include: high occupancy vehicle lanes, arterial traffic flow improvements, park-and-ride lots, transit service improvements, area-wide rideshare, and intelligent transportation systems (formerly known as intelligent vehicle highway systems).

(2) Employer Trip Reduction

The 74th Session of the Texas Legislature passed and the Governor signed Senate Bill 290, which delays the Employer Trip Reduction Program for 180 days (until October 8, 1995). The Governor has the ability to extend the delay for consecutive 45 day increments. During this period, the TNRCC is working closely with the Houston-Galveston Area Council, Houston Metro, the district office of the Texas Department of Transportation, and other stakeholders to develop an alternative program that does not have the mandatory requirements for Houston/ Galveston area employers. This revised program is known as the Regional Commute Alternatives Program (RCAP). Funded for the first two years largely with federal Congestion Mitigation Air Quality funds, the RCAP includes rideshare matching, a vanpool quickstart, funding for Transportation Management Organizations, a major public information/marketing program, and technical assistance components.

(3) Vehicle Inspection/Maintenance Program

Senate Bill 178, passed by the 74th Texas Legislature, 1995, gives implementation responsibility for an interim Inspection and Maintenance program to the Texas Department of Public Safety and directs the TNRCC to adopt emergency rules to repeal conflicting requirements as soon as possible. On June 14, 1995 (published in the June 23, 1995, issue of the Texas Register (20 TexReg 4523)), the TNRCC adopted emergency rules that repealed §§114.3, 114.6, and 114.7, concerning Inspection Requirements, Hardship Eligibility Criteria, and Inspection and Maintenance Fees. In addition, the TNRCC adopted on an emergency basis a new §114.3, concerning Inspection Requirements. The TNRCC is scheduled to permanently adopt these rule changes this Fall.

The new §114.3 requires motorists to comply with air pollution emission control requirements included in the annual vehicle safety inspection program. The new section also requires that the rules and regulations adopted by DPS be completely and properly performed prior to the issuance of a vehicle inspection certificate. The old §114.6 established the hardship eligibility criteria. The DPS may now promulgate such standards. The old §114.7 set fees for inspections and fees associated with conducting tests. The DPS will now promulgate such standards.

The Governor's office will negotiate the type of final I/M program to be implemented in the HGA area. Public hearings will be conducted prior to implementation of any program. A public information program will be conducted to advise motorists of the vehicle emissions testing program.

4) Reformulated Gasoline and Clean Alternative Fuels

Beginning on January 1, 1995, only reformulated gasoline (RFG) is marketed in the HGA nonattainment area. RFG has significant air quality benefits for both on-road and non-road gasoline engines.

Provisions of the 1990 FCAA Amendments created the FCFF program. The program affects all private and public fleets with 10 or more vehicles in serious, severe, and extreme non-attainment areas. The affected fleets are required to ensure that percentages of their purchases, starting in 1998, reach a minimum of the LEV standards, using clean fuels (natural gas, propane, methanol, ethanol, electricity, RFG, and low-sulfur diesel). The FCFF program gave states the option of opting-out to implement a substitute program, provided that it demonstrates equivalent reductions to those resulting from the federal program. Texas chose to opt-out of the federal program to implement the TAFF program, which was adopted by the TNRCC on July 6, 1994.

Senate Bill 200, passed by the 74th Texas Legislature in 1995, amended statutory alternative fuels requirements. SB200's changes will impact the TAFF program's requirements. The agency is in the process of evaluating these impacts and intends to complete a rule and SIP revision by early 1996.

3) Evidence of Attainment (No Change.)

4) Contingency Plan (No Change.)

12. SOCIAL AND ECONOMIC CONSIDERATIONS OF THE PLAN

a.-h. (No change.)

13. FISCAL AND MANPOWER RESOURCES

14. HEARING REQUIREMENTS

a.-f. (No change.)

g. Public Hearings for Post-96 ROP Fix-Up SIP Revisions (New.)

Table 19 lists the public hearings that were conducted in each of the nonattainment areas regarding the Post-96 ROP Fix-Up SIP.

TABLE 19

Public Hearings for the 9% Rate-of-Progress Fix-Up SIP

NONATTAINMENT AREA	DATE	TIME	LOCATION
Houston/Galveston	October 3, 1995	7:00pm	Houston-Galveston Area Council
Beaumont/Port Arthur	October 4, 1995	10:00am	John Gray Institute

APPENDIX B

Control Measure Catalog

"One Pagers"

CONTROL MEASURE CATALOG INDEX

MOBILE SOURCES

1. NON METRO AREA TRANSIT
2. BICYCLE IMPROVEMENTS
3. PARKING MANAGEMENT
4. TELECOMMUTING
5. FLEXIBLE WORK SCHEDULES
6. CONTROL OF TRUCK MOVEMENTS
7. CONTROL OF EXTENDED VEHICLE IDLING
8. TAFF PROGRAM REQUIREMENTS EXTENDED TO VEHICLES OVER 26,000 LBS. GROSS VEHICLE WEIGHT RATING (GVWR)
9. TEXAS DIESEL (SCENARIO #1)
10. TEXAS DIESEL (SCENARIO #2)
11. TEXAS DIESEL (SCENARIO #3)
12. BIENNIAL INSPECTION & MAINTENANCE
13. SMALL ENGINE EMISSION STANDARDS
14. ANNUAL INSPECTION & MAINTENANCE
15. EMISSION STANDARDS FOR LOCOMOTIVES
16. NON METRO AREA TRANSIT (EXPRESS BUS SERVICE)
17. VEHICLE SCRAPPAGE
18. ELECTRIC LAWN AND GARDEN EQUIPMENT

AREA SOURCES

19. ARCHITECTURAL COATINGS
20. BICYLE LANES
21. OTHER SPECIAL PURPOSE COATINGS
22. TRAFFIC MARKINGS
23. PARKING MANAGEMENT (EMPLOYER-BASED)
24. TELECOMMUTING (HOME-BASED WORK SITE)
25. FLEXIBLE WORK SCHEDULES
26. GRAPHIC ARTS: PUBLICATION FLEXOGRAPHY (CATALYTIC INCINERATORS)
27. GRAPHIC ARTS: PUBLICATION FLEXOGRAPHY (CARBON ADSORPTION)
28. GRAPHIC ARTS: PACKAGING FLEXOGRAPHY (THERMAL INCINERATORS)
29. GRAPHIC ARTS: PACKAGING FLEXOGRAPHY (CATALYTIC INCINERATORS)
30. GRAPHIC ARTS: PACKAGING FLEXOGRAPHY (CARBON ADSORPTION)
31. CONTROL OF TRUCK MOVEMENTS
32. GRAPHIC ARTS: PACKAGING GRAVURE (THERMAL INCINERATORS)
33. GRAPHIC ARTS: PUBLICATION GRAVURE (THERMAL INCINERATORS)
34. CONTROL OF EXTENDED VEHICLE IDLING RESTRICT DRIVE THRUS AND TOLL BOOTHS
35. GRAPHIC ARTS: PRODUCT GRAVURE (CATALYTIC INCINERATORS)
36. GRAPHIC ARTS: PACKAGING GRAVURE (CATALYTIC INCINERATORS)

37. GRAPHIC ARTS: PUBLICATION GRAVURE (CARBON ADSORPTION)
38. GRAPHIC ARTS: PACKAGING GRAVURE (CARBON ADSORPTION)
39. GRAPHIC ARTS: PRODUCT GRAVURE (CARBON ADSORPTION)
40. OFFSET LITHOGRAPHY: FOUNTAIN SOLUTION (MAGNETS)
41. OFFSET LITHOGRAPHY: DRYERS (CATALYTIC OXIDIZERS)
42. OFFSET LITHOGRAPHY: FOUNTAIN SOLUTION (WATERLESS PLATES)
43. OFFSET LITHOGRAPHY: CLEANING SOLVENTS (SCENARIO 1)
44. OFFSET LITHOGRAPHY: CLEANING SOLVENTS (SCENARIO 2)
45. OFFSET LITHOGRAPHY: DRYERS (CARBON CANISTERS)
46. OFFSET LITHOGRAPHY: DRYERS (THERMAL INCINERATORS)
47. FURNITURE & FIXTURES SURFACE COATING
48. MACHINERY & EQUIPMENT SURFACE COATING
49. MISCELLANEOUS METAL PARTS & PRODUCTS SURFACE COATING
50. FACTORY FINISHED WOOD COATING
51. SHEET, STRIP, AND COIL SURFACE COATING
52. CONSUMER PRODUCTS
53. CONSUMER PRODUCTS - HAIRSPRAYS
54. CONSUMER PRODUCTS - AUTOMOTIVE WINDSHIELD WASHER FLUID
55. AGRICULTURAL PESTICIDE APPLICATION
56. NAPHTHA DRY CLEANERS
57. MUNICIPAL SOLID WASTE LANDFILLS

POINT SOURCES

58. GENERAL SURFACE COATING APPLICATION
59. METAL CAN SURFACE COATING
60. SURFACE COATING - COATING OVENS
61. CHEMICAL MANUFACTURING - LOADING RACKS; TRANSPORTATION & MARKETING - TANK TRUCKS/CARS LOADING; PETROLEUM STORAGE TANK - LOADING RACKS
62. MARINE VESSEL LOADING (POINT & AREA SOURCES)
63. OIL & GAS PRODUCTION (GLYCOL DEHYDRATORS)
64. BREWERIES
65. PULP & PAPER
66. STATIONARY EXTERNAL COMBUSTION
67. MISCELLANEOUS MANUFACTURING INDUSTRIES
68. PRIMARY METAL PRODUCTION
69. CHEMICAL MANUFACTURING - FUGITIVE LEAKS
70. CHEMICAL MANUFACTURING - COOLING TOWERS
71. CHEMICAL MANUFACTURING - INDUSTRIAL WASTEWATER
72. FLARES
73. INCINERATORS
74. CHEMICAL MANUFACTURING - NON-SOCMI PROCESS VENTS
75. OIL & GAS PRODUCTION - FUGITIVE LEAKS
76. ORGANIC CHEMICAL STORAGE - FIXED ROOF
77. PETROLEUM INDUSTRY - PROCESS VENTS

78. PETROLEUM INDUSTRY - FUGITIVE LEAKS
79. PETROLEUM STORAGE TANKS - FIXED ROOF
80. PETROLEUM STORAGE TANKS - FLOATING ROOF
81. PETROLEUM STORAGE TANKS - UNDERGROUND TANKS
82. PETROLEUM INDUSTRY - COOLING TOWERS
83. PETROLEUM INDUSTRY - INDUSTRIAL WASTEWATER
84. CHEMICAL MANUFACTURING - SOCMI AIR OXIDATION, DISTILLATION & REACTOR VENTS (SCENARIO 1)
85. CHEMICAL MANUFACTURING - SOCMI AIR OXIDATION, DISTILLATION & REACTOR VENTS (SCENARIO 2)
86. TRANSPORTATION AND MARKETING - FUGITIVE LEAKS
87. STATIONARY INTERNAL COMBUSTION

EMISSION CONTROL MEASURES
(DESCRIPTIVE INDUSTRY SOURCE CLASSIFICATION)

Control Measure Description: This section shall describe the conceptualized control measure, and impact (if any) on existing rules.
Control Measure Source: This section lists the reference(s) used to develop the conceptualized control measure.
Rule Effectiveness: Identifies the assumed rule effectiveness. **Control Efficiency** Identifies the assumed control efficiency. **Rule Penetration**: Identifies the assumed rule penetration (if applicable).
Source of Projected Emissions: Description of typical emission point(s) to impacted by the control measure. **Identified SCCs:** A comprehensive list of the SCCs affected by the control measure (if applicable). **Total Affected Emissions (adjusted 1999 EI):** The actual 1990 Emissions Inventory Tons per Ozone Day affected by the control measure.
Affected Parties: States the industries and nonattainment areas impacted by the conceptualized control measure.
Estimated Costs: This section should synopsize assumptions made concerning cost. It should include up front capital costs, an amortized annual value, an assumption of annual maintenance costs, an attempt to quantify indirect and social costs. It could also include any other cost type information which may prove pertinent during the decision making process. A reference to where the cost analysis came from would also be helpful. **Cost Effectiveness:** This is a measure of the total capital cost divided by the total affected emissions.
Comments: This section should include discussions of the reactivity and toxicity of the VOCs to be reduced. Reactivity and toxicity should be tagged to those processes which contribute the most to emissions. A discussion of any NOx increases as a result of VOC reduction should be estimated here.
Staff Contact: Name and Phone number of person responsible for preparing this page.

Mobile Sources

EMISSION CONTROL MEASURE (#1)
Non Metro Area Transit

Control Measure Description:	To provide transit service to the metropolitan area that is not currently serviced by the public transit system. This can by accomplished by bus service and/or paratransit service to the area not currently served.
Control Measure Source:	United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.
Rule Effectiveness: N/A **Control Efficiency** **Rule Penetration:** N/A	
Source of Projected Emissions: Bus and paratransit emissions from an increase in transit service. **Identified SCCs:** N/A **Total Affected Emissions (adjusted 1999 EI):** 99.76 Tons per Ozone Day	
Affected Parties:	Those outlying areas that are not currently served by the public mass transportation system. This would affect areas in the Houston/Galveston nonattainment area that are not currently served by a mass transit system.
Estimated Costs: **Cost Effectiveness:**	
Comments:	Legislative authority may be needed in order to carry out the non-metro area transit. Since transit is contingent upon sales tax levied, only those areas that are in the sales tax area receive transit service. Transit service to areas that are not currently serviced could be a valuable asset not only in the short term but also in the long term.
Staff Contact: Teresa Hardin Nguyen (512) 239-0599 work (512) 239-1514 fax	

EMISSION CONTROL MEASURE (#2)
Bicycle Improvements

Control Measure Description: Measures to encourage pedestrian travel as a viable alternative transportation mode to the single occupant vehicle.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency
Rule Penetration: N/A

Source of Projected Emissions: Bicycling has the potential of reducing emissions 100% for that particular trip. Bicycling could also be used in conjunction with transit or other forms of transportation.

Identified SCCs: N/A

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: Students, commuters, and recreation make up the majority of bicycle users. This program could be combined with the ETR or ECO program in the Houston/Galveston nonattainment area.

Estimated Costs: Annualized Costs=$5,021 Cost per ton reduction=$215,864. Most of this money comes from enhancement or CMAQ funds.

Costs of this program include:
* developing a system of bicycle routes, lanes, and paths;
* providing plans and maps;
* providing lockers, racks, and other storage facilities; and
* ancillary facilities (showers and clothing lockers)

Cost Effectiveness:

Comments: A progressive bicycle program is needed in order to get a measurable air quality benefit. The reduction of trips or VMT is a direct emissions reduction benefit if the program is used properly. This reduces trips be 100%.

A 50% increase in commute trips made by bicycle would result in the following:
* 6.56% reduction in hydrocarbons
* 7.00% reduction in carbon monoxide, and
* 14.97 reduction in nitrogen oxides.

These statistics are from the University of Wisconsin
Walker, "Of Bikes and Cars: An Urban Transportation Emissions Model," University of Wisconsin, July 8, 1988.

Staff Contact: Teresa Hardin Nguyen (512) 239-0599 work (512) 239-1514 fax

EMISSION CONTROL MEASURE (#3)
Parking Management

Control Measure Description: A program to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use; and programs and ordinances to facilitate non-automobile travel, etc. Parking management strategies can include preferential parking for HOV, public sector pricing, parking requirements in zoning codes, and control of parking supply.

Control Measure Source: Loudon, William R., Deborah A. Dagang, and Robert Dulla, "The Effectiveness of Transportation Control Measures in Reducing Congestion and Improving Air Quality." Air and Waste Management Association. Denver, CO. June 1993.

Rule Effectiveness: N/A
Control Efficiency
Rule Penetration: N/A

Source of Projected Emissions: Vehicles driving to and from the work site in areas with high concentrations of emissions, especially during peak use.

Identified SCCs:

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: This program primarily effects persons riding in single-occupant vehicles parking in dense or highly congested areas. This would include the Houston/Galveston non-attainment area.

Estimated Costs: Cost would include setting up and implementing the program as well as provide enforcement action. The type of parking program could influence total cost.

Cost Effectiveness:

Comments: Parking management strategies are most effective when implemented in dense CBDs that have limited available parking. If there is an excess of parking, this will diminish the effectiveness of the parking management program. Parking Management can be an effective tool for local government to reduce traffic and associated emissions in congested areas by encouraging travelers to use modes other than driving alone. Four strategies can be applied with the public sector: preferential parking policies for high occupancy vehicles (HOV); public sector pricing policies; parking requirements in zoning codes; and control of parking supply.

Parking management has the potential of reducing period trips by 6.25% and off-peak trips by 2.6%. This is due to the elimination of trips.

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EMISSION CONTROL MEASURE (#4)
Telecommuting

Control Measure Description:	Telecommuting is working at a location other than one's usual office, and therefore avoiding the trip to the office, while performing the same duties as would otherwise be performed in the central office.
Control Measure Source:	United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.
Rule Effectiveness: N/A **Control Efficiency** **Rule Penetration:** N/A	
Source of Projected Emissions:	Even though telecommuting is working at locations other than one's usual office, this could result in emissions to a satellite work site. This program could either be for the entire Houston/Galveston ozone nonattainment area or could be in areas of higher concentration of vehicular traffic.
Identified SCCs:	N/A
Total Affected Emissions (adjusted 1999 EI):	99.76 Tons per Ozone Day
Affected Parties:	Telecommuting is widely used by many employers, both large and small, on a national scale. Telecommuting is favored because it allows the employee to work at home on a flexible schedule.
Estimated Costs:	Cost for this program has not yet been determined because of the lack of information about employee involvement. Equipment and computer hook-up, satellite work center and training is part of the cost, depending on the particular program developed.
Cost Effectiveness:	
Comments:	A reduction in vehicle trips due to this program could and would have positive air quality benefits to the area. Positive air quality benefits include reduced trips and VMT during peak and non-peak periods and reduced hot and cold starts. Unfortunately, a thorough survey of employees and employers would need to be conducted in order to assist in the evaluation of this program.
Staff Contact:	Teresa Hardin Nguyen (512) 239-0599 work (512) 239-1514 fax

EMISSION CONTROL MEASURE (#5)
Flexible Work Schedules

Control Measure Description: Changes in work schedule to provide greater flexibility in work schedules and reduce the volume of commute and travel during peak periods.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency
Rule Penetration: N/A

Source of Projected Emissions: Vehicular emissions. Overall emissions may rise or fall depending on success of program.

Identified SCCs: N/A

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: Flexible work schedules are widely used by many employers, both large and small on a national scale. This TCM allows the employee to work a full time schedule with the flexibility to arrange the hours. This program could be used in the Houston/Galveston nonattainment area or could be modified to the highest congested areas.

Estimated Costs: Cost for this program has not yet been determined because of the lack of information about employee involvement. Set schedules are not easily obtainable due to the flexibility of the program. Once the program is on-line, the administration costs should decrease as everyone becomes accustom to the new work schedule.

Cost Effectiveness:

Comments: This program can be combined with the ETR or ECO program. Flexible work schedules may provide greater flexibility in arrival and departure times to support ridesharing activities. Positive air quality impacts include reduced peak period congestion and a modal shift. Negative impacts may be that flexible work schedules cause some transit users to drive alone thus offsetting the initial benefit.

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EMISSION CONTROL MEASURE (#6)
Control of Truck Movements

Control Measure Description: Controlling or restricting trucks from certain areas, restricting loading zones, and/or scheduling deliveries. This could include restricting certain areas of the central business district, certain hours of the day, and/or removal of trucks from the freeway/highway.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency:
Rule Penetration: N/A

Source of Projected Emissions: Emissions generated from heavy duty trucks operating during peak periods.

Identified SCCs: N/A

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: Truck drivers, freight and delivery companies operating in the Houston/Galveston nonattainment area.

Estimated Costs: Higher costs may result due to banning heavy duty trucks from peak period use. This would force them to operate at inconvenient times and might increase shipping and receiving fees, which would have to be offset by the consumer. Incident management strategies for truck safety would add to the overall cost of the project as well as a cost to implement the program.

Cost Effectiveness:

Comments: Controlling movements in certain areas area can be very beneficial in reducing congestion and the associated pollution generated from this control. Shifting peak period truck movements could have a negative effect on air quality. If the trucks are being banned from freeway use or other areas, this could shift the traffic on to other facilities causing those facilities to be congested. This could result in slightly negative air quality impacts.

Also, removing trucks from the freeway facilities could increase overall speeds which may lead to lower VOC levels but slightly higher NOx levels.

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EMISSION CONTROL MEASURE (#7)
Control of Extended Vehicle Idling

Control Measure Description: Measures to reduce the amount of time which vehicles spend in idle mode as part of their overall operation.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington, D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency: N/A

Source of Projected Emissions: Tailpipe emissions generated as a result of vehicle idling. Includes passenger and heavy duty vehicles. Reductions in idle time emissions are the product of the idle emission rate, in grams per hour, and the number of hours per day in reduced idling time. Sources of projected emissions include drive-thru, curbside, and bus/truck.

Identified SCCs: N/A

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: Controls on construction and operation of drive-thru facilities such as banks and fast food restaurants; controls on extended vehicle idling during layover time, particularly of diesel engines used by transit vehicles and delivery trucks.

Estimated Costs:

Cost Effectiveness:

Comments: Laws can be enacted to limited idle time of heavy-duty vehicles if the vehicle is not performing useful work. Time limits can be set by the legislature. Also, drive-up window design can be modified as to minimize idling time or queue time.

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EMISSION CONTROL MEASURE (#8)
TAFF Program Requirements Extended to Vehicles Over 26,000 LBS. GVWR

Control Measure Description: This control measure would extend the requirements of the Texas Alternative Fuel Fleet (TAFF) program to vehicles weighing more than 26,000 lbs. gross vehicle weight rating (GVWR). Beginning September 1, 1998, any vehicle purchased, leased, or otherwise acquired by affected fleets would be required to be certified to a minimum of the low emission vehicle (LEV) standards.

Control Measure Source: *Adopting the California Low Emission Vehicle Program in Texas*, E.H. Pechan and Associates, Inc., Report No. 92.09.012/259 (Revised), Prepared for the Texas Air Control Board, 1993; *Quantifying the Emission Reductions Due to the Texas Alternative Fuel Fleet Program*, Engine, Fuel, and Emissions Engineering, Inc., Prepared for the Texas Natural Resource Conservation Commission, 1995; *Regulatory Impact Analysis Clean Fuel Fleet Program*, U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Mobile Sources, 1994; American Automobile Manufacturers Association estimates for light-duty LEV vehicles for the OTC-LEV program..

Rule Effectiveness: n/a
Control Efficiency: n/a
Rule Penetration: n/a

Source of Projected Emissions: Medium heavy-duty on-road vehicles over 26,000 lbs. GVWR and heavy heavy-duty on-road vehicles operated in fleets with 15 or more vehicles that operate in the nonattainment area. This would include trucks, transit buses, and large school buses.

Identified SCCs: n/a

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: Owners/operators of fleets with 15 or more vehicles that operate in the nonattainment area.

Estimated Costs: The estimates for the costs of the program were based upon assumptions made by EPA in its Regulatory Impact Analysis of the Clean Fuel Fleet Program. EPA made a number of assumptions for the incremental costs of acquiring heavy-duty LEV vehicles, both gasoline- and diesel-powered. The most expensive EPA estimate was an incremental cost of $477.00 for diesel-powered LEV heavy-duty vehicles. EPA did not assume any additional maintenance or fuel costs.

Cost Effectiveness: Based on staff assumptions (please see attachment), the costs are estimated to be $1249/ton NMOG, $668/ton NOx, $193/ton CO for a transit bus; $4736/ton NMOG, $2534/ton NOx, $766/ton CO for a school bus; and $1358/ton NMOG, $727/ton NOx, and $211/ton CO for a heavy-duty truck.

Comments: Because the LEV standards provide for NOx reductions, there is no NOx increase associated with this program.

This requirement would exceed the Federal Clean Fuel Fleet requirements, which do not include vehicles over 26,000 lbs. GVWR. In addition, proposed legislation currently before the Legislature would specifically exempt privately owned and local government vehicles over this weight from the requirements of the **Texas Alternative Fuels Program** if finally passed. This may have to be interpreted as the intent of the Texas Legislature that these vehicles **not** be covered under any such fleet programs. However, in its current form the bill does impose the LEV standards on vehicles over 26,000 lbs. GVWR for transit and state fleets. This bill has not been finally passed by the Legislature at this writing. (3/15/95)

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EMISSION CONTROL MEASURE (#9)
Proposed Texas Diesel
Scenario 1

Control Measure Description: Proposed Texas Diesel is a reformulation of low sulfur diesel. The proposed fuel would have a raised cetane number in order to decrease NOx and VOC emissions. This scenario assumes a 10 number raise in cetane (44 to 54), a $0.07 increase per gallon cost, and a 33% aromatic concentration.

Control Measure Source: 1990 TNRCC on-road and off-road diesel inventories and fuel estimates.

Effects of Fuel Aromatics, Cetane Number, and Cetane improver on Emissions from a 1991 Prototype Heavy-Duty Engine., SAE Paper 902171, October 1990.*

The National Petroleum Refiners Association Update on the Effect of Government Regulations on Diesel Fuels, Amoco Oil Company Naperville, Illinois, Christopher I. McCarthy.

Diesel Fuel Property Effects on Exhaust Emissions from a Heavy Duty Diesel Engine That Meets 1994 Emissions Requirements, SAE Paper 922267, Christopher I. McCarthy, Amoco Oil Company, Warren J. Slodowske, Edward J. Sienicki, and Richard E. Jass, Navistar International Transportation Corp.

*The most recent SAE papers regarding diesel fuel cetane number and its relation to emissions are contained in 1995 SAE publications 950249, 950250, and 950251. These papers will be reviewed for a more recent predictive equation to estimate emission responses to cetane changes. Cost and emission estimates may therefore be modified to reflect this most recent data.

Rule Effectiveness: N/A
Control Efficiency: HC:51%, NOx:3%, CO:26%
Rule Penetration: 100%

Source of Projected Emissions: All on- and off-road diesel powered vehicles in the eight county Houston/Galveston non-attainment area (excluding locomotives and marine vessels).

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 23.41 tons/day VOCs, 214.75 tons/day NOx, 102.25 tons/day CO

Affected Parties: Owner/Operators of diesel powered vehicles and engines, Oil industry and distributors of diesel fuel.

Estimated Costs: $0.07 per gallon

Cost Effectiveness: HC:$4621/ton, NOx:$8161/ton, CO:$2053/ton

Comments:	EPA has stated that it may be possible to implement this measure only after: The state shows that the control is necessary to meet air quality standards, and that no other methods are available, or if other methods are available they are unreasonable or impracticable to implement. All price information is from a single source (additive maker Ethyl Corp.) and therefore may be not be representative of the actual costs of this control measure. This program may be difficult to implement in light of the significant problems California has had with their "clean diesel" program. The program may be difficult to enforce only on a regional level.
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EMISSION CONTROL MEASURE (#10)
Proposed Texas Diesel
Scenario 2

Control Measure Description: Proposed Texas Diesel is a reformulation of low sulfur diesel. The proposed fuel would have a raised cetane number in order to decrease NOx and VOC emissions. This scenario assumes a 10 number raise in cetane (40 to 50), a $0.03 increase per gallon cost, and a 35% aromatic concentration.

Control Measure Source: 1990 TNRCC on-road and off-road diesel inventories and fuel estimates.

Effects of Fuel Aromatics, Cetane Number, and Cetane improver on Emissions from a 1991 Prototype Heavy-Duty Engine., SAE Paper 902171, October 1990.*

The National Petroleum Refiners Association Update on the Effect of Government Regulations on Diesel Fuels, Amoco Oil Company Naperville, Illinois, Christopher I. McCarthy.

Diesel Fuel Property Effects on Exhaust Emissions from a Heavy Duty Diesel Engine That Meets 1994 Emissions Requirements, SAE Paper 922267, Christopher I. McCarthy, Amoco Oil Company, Warren J. Slodowske, Edward J. Sienicki, and Richard E. Jass, Navistar International Transportation Corp.

*The most recent SAE papers regarding diesel fuel cetane number and its relation to emissions are contained in 1995 SAE publications 950249, 950250, and 950251. These papers will be reviewed for a more recent predictive equation to estimate emission responses to cetane changes. Cost and emission estimates may therefore be modified to reflect this most recent data.

Rule Effectiveness: N/A
Control Efficiency: HC:65%, NOx:5%, CO:36%
Rule Penetration: 100%

Source of Projected Emissions: All on- and off-road diesel powered vehicles in the eight county Houston/Galveston non-attainment area (excluding locomotives and marine vessels).

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 23.41 tons/day VOCs, 214.75 tons/day NOx, 102.25 tons/day CO

Affected Parties: Owner/Operators of diesel powered vehicles and engines, Oil industry and distributors of diesel fuel.

Estimated Costs: $0.03 per gallon

Cost Effectiveness: HC:$4148/ton, NOx:$6395/ton, CO:$1706/ton

Comments:	EPA has stated that it may be possible to implement this measure only after: The state shows that the control is necessary to meet air quality standards, and that no other methods are available, or if other methods are available they are unreasonable or impracticable to implement. All price information is from a single source (additive maker Ethyl Corp.) and therefore may be not be representative of the actual costs of this control measure. This program may be difficult to implement in light of the significant problems California has had with their "clean diesel" program. The program may be difficult to enforce only on a regional level.
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EMISSION CONTROL MEASURE (#11)
Proposed Texas Diesel
Scenario 3

Control Measure Description: Proposed Texas Diesel is a reformulation of low sulfur diesel. The proposed fuel would have a raised cetane number in order to decrease NOx and VOC emissions. This scenario assumes a 15 number raise in cetane (40 to 55), a $0.09 increase per gallon cost, and a 35% aromatics concentration.

Control Measure Source: 1990 TNRCC on-road and off-road diesel inventories and fuel estimates.

Effects of Fuel Aromatics, Cetane Number, and Cetane improver on Emissions from a 1991 Prototype Heavy-Duty Engine., SAE Paper 902171, October 1990.*

The National Petroleum Refiners Association Update on the Effect of Government Regulations on Diesel Fuels, Amoco Oil Company Naperville, Illinois, Christopher I. McCarthy.

Diesel Fuel Property Effects on Exhaust Emissions from a Heavy Duty Diesel Engine That Meets 1994 Emissions Requirements, SAE Paper 922267, Christopher I. McCarthy, Amoco Oil Company, Warren J. Slodowske, Edward J. Sienicki, and Richard E. Jass, Navistar International Transportation Corp.

*The most recent SAE papers regarding diesel fuel cetane number and its relation to emissions are contained in 1995 SAE publications 950249, 950250, and 950251. These papers will be reviewed for a more recent predictive equation to estimate emission responses to cetane changes. Cost and emission estimates may therefore be modified to reflect this most recent data.

Rule Effectiveness: N/A
Control Efficiency: HC:73%, NOx:6%, CO:43%
Rule Penetration: 100%

Source of Projected Emissions: All on- and off-road diesel powered vehicles in the eight county Houston/Galveston non-attainment area (excluding locomotives and marine vessels).

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 23.41 tons/day VOCs, 214.75 tons/day NOx, 102.25 tons/day CO

Affected Parties: Owner/Operators of diesel powered vehicles and engines, Oil industry and distributors of diesel fuel.

Estimated Costs: $0.09 per gallon

Cost Effectiveness: HC:$4131/ton, NOx:$5735/ton, CO:$1606/ton

Comments:	EPA has stated that it may be possible to implement this measure only after: The state shows that the control is necessary to meet air quality standards, and that no other methods are available, or if other methods are available they are unreasonable or impracticable to implement. All price information is from a single source (additive maker Ethyl Corp.) and therefore may be not be representative of the actual costs of this control measure. This program may be difficult to implement in light of the significant problems California has had with their "clean diesel" program. The program may be difficult to enforce only on a regional level.
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EMISSION CONTROL MEASURE (#12)
BIENNIAL INSPECTION/MAINTENANCE (I/M)

Control Measure Description:	Decentralized biennial vehicle inspections using the basic standard.
Control Measure Source:	Federal Clean Air Act, EPA guidance, Texas legislature
Rule Effectiveness: **Control Efficiency:** **Rule Penetration**:	18% 20% 90%
Source of Projected Emissions:	Automobiles and light duty trucks.
Identified SCCs:	NA
Total Affected Emissions (adjusted 1999 EI):	99.76 tons per day
Affected Parties:	General public, commercial, private, and public vehicle fleet owners.
Estimated Costs:	The cost analysis procedure was obtained from the TNRCC mobile source division and approved by EPA. The assumptions used in the analysis include: $35 per inspection, 1.5 million vehicles inspected per year, 20% failure rate, $150 average repair, 1000 gallons per year average vehicle fuel use at $1.10 per gallon, and a 13% fuel savings. Cost per inspection will vary as it will be set by the market.
Cost Effectiveness:	Estimated VOC reduction is 27.35 tons per day or 10,052 tons per year. Estimated cost is $28,400,000 per year for a figure of $2810 per ton.
Comments:	The VOC reduction is primarily gasoline vapor which has a health effect screening level of 3500 ppb for a one hour average. Mean incremental reactivity for substances in gasoline is 2. There is no NOx increase associated with this program.
Staff Contact:	Beecher Cameron (512) 239-1495.

EMISSION CONTROL MEASURE (#13)
SMALL ENGINE EMISSION STANDARDS

Control Measure Description: The federal government is setting exhaust emission standards for small internal combustion engines (25 horsepower and less). The standards take effect in January 1996 and are phased in over two years. The reduction is the difference between the credit received for 1999 and that projected for 2007.

Control Measure Source: U.S. Environmental Protection Agency

Rule Effectiveness: 51.8%

Control Efficiency: 51.8%

Rule Penetration: 100%

Source of Projected Emissions: Internal combustion engines 25 horsepower and less. These engines are used in a wide variety of applications, but the primary source of emissions is residential lawn and garden use. Light industrial uses include generators, pumps, and small forklifts.

Identified SCCs: NA

Total Affected Emissions (Adjusted 1999 EI): 90.74 tons per day VOC 13.15 tpd NOx

Affected Parties: Primarily engine manufacturers. Engines will be manufactured for lower emissions. No add-on devices will be necessary.

Estimated Costs: EPA has estimated that the cost increase for engines meeting new emission standards will be approximately $5 per engine. TNRCC did not find any figures for cost per ton. In order to arrive at a cost per ton figure, TNRCC has computed the approximate number of engines that must be replaced to reduce VOC emissions by one ton and multiplied that number by the $5 cost increase per engine. Other assumptions include a 20 gram per horsepower-hour emission differential between older and complying four cycle engines and a 197 gram per hp-hr for two-cycle. Estimated hours of use each year are 60 and the average power rating is 3 horsepower.

Cost Effectiveness: Estimated VOC reduction is 47.00 tons per day by 2007. This is a 51.8% reduction. Percentage of reduction will continue to rise to projected high of 90% in 2010. Cost per ton of VOC reduced is estimated at $740. Cost effectiveness does not include any estimated fuel savings from the leaner running engines.

Comments:	There is a NOx increase from the implementation of these standards. NOx should increase approximately 13 tpd in 2007 over the projected inventory to a figure of 26.13 tpd. This rule will likely provide incentive for some manufacturers to change their equipment from two-cycle to four-cycle engines or electric motors. This is the most significant change for users of the equipment. The VOC reduction is primarily gasoline vapor which has a health effect screening level of 3500 ppb for a one hour average. Mean incremental reactivity for the substances in gasoline is 2.
Staff Contact:	Beecher Cameron (512) 239-1495.

EMISSION CONTROL MEASURE (#14)
ANNUAL INSPECTION/MAINTENANCE (I/M)

Control Measure Description: Centralized annual vehicle inspections using the enhanced standard with I/M 240.

Control Measure Source: Federal Clean Air Act and EPA guidance

Rule Effectiveness: 36%
Control Efficiency: 40%
Rule Penetration: 90%

Source of Projected Emissions: Automobiles and light duty trucks.

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 99.76 Tons per Ozone Day

Affected Parties: General public, commercial, private, and public vehicle fleet owners.

Estimated Costs: The cost analysis procedure was obtained from the TNRCC mobile source division and approved by EPA. The assumptions used in the analysis include: $28 per inspection, 3 million vehicles inspected per year, 20% failure rate, $150 average repair, 1000 gallons per year average vehicle fuel use at $1.10 per gallon, and a 13% fuel savings. An annual I/M program is estimated to yield an additional 3% reduction benefit over the biennial program. The cost per inspection increases to $28 to cover construction of additional stations.

Cost Effectiveness: Estimated VOC reduction is 56.73 tons per day or 20,707 tons per year. Estimated cost is $88,000,000 per year for a figure of $4250 per ton.

Comments: The VOC reduction is primarily gasoline vapor which has a health effect screening level of 3500 ppb for a one hour average. Mean incremental reactivity for substances in gasoline is 2. There is no NOx increase associated with this program.

Staff Contact: Beecher Cameron (512) 239-1495.

EMISSION CONTROL MEASURE (#15)
EMISSION STANDARDS FOR LOCOMOTIVES
PROPOSED FEDERAL REGULATION

Control Measure Description: This regulation proposes two tiers of emission standards for locomotives that are freshly manufactured after 1/1/2000. The first tier standards will apply to locomotives manufactured from 1/1/2000 through 12/31/2004. The second tier standards will apply to locomotives manufactured after 1/1/2005.

EPA also expects to propose standards for locomotive engines originally manufactured between 1/1/1973 and 12/31/1999 when they are remanufactured after 1/1/2000.

Control Measure Source: Section 213(a)(5) of the Clean Air Act amendments. The rule is expected to be proposed in Spring of 1995.

Rule Effectiveness:
Control Efficiency:
Rule Penetration:

Source of Projected Emissions: Newly manufactured locomotives after January 1, 2000, and remanufactured locomotives originally manufactured between January 1, 1973 and December 31, 1999.

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 1.14 TPD of VOC, 17.64 TPD of NOx

Affected Parties: Manufacturers and rebuilders of locomotives

Estimated Costs:

Cost Effectiveness:

Comments: The Tier 1 standards are expected to reduce NOx emissions from newly manufactured locomotives by 50 percent from uncontrolled levels. NOx standards from pre-2000 remanufactured locomotives are expected to f\reduce these emissions by approximately one third from uncontrolled levels.

The Tier II standards are expected to reduce NOx emissions from freshly manufactured locomotives by two thirds and PM emissions by approximately one half from uncontrolled emissions.

This rule will primarily reduce NOx, however, EPA expects to also set standards for hydrocarbon (HC), carbon monoxide (CO), particulate matter (PM), and smoke emissions as part of the emission standards. These standards are anticipated to approximately equal present emission levels, there by constraining any increase in emissions of these pollutants that could otherwise occur as a result of the decrease in NOx.

Staff Contact: Andrea Griswold (512) 239-1761

EMISSION CONTROL MEASURE (#16)
NON METRO AREA TRANSIT
(EXPRESS BUS SERVICE)

Control Measure Description: To provide transit service to the metropolitan area that is not currently serviced by the public transit system. This analysis looks into expanding the express bus service to accommodate outlying areas.

Control Measure Source: Metropolitan Transit Authority of Harris County, Texas: Transit Services Program FY 1994-1998.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: N/A

Source of Projected Emissions: Bus emissions from an increase in transit service for areas not currently served by transit. Emissions benefit achieved by reducing emissions from single occupant vehicles. Benefit may be partially offset by the increase in bus emissions.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Those outlying areas that are not currently served by the public mass transportation system. This has the potential of affecting areas in the Houston/Galveston nonattainment.

Estimated Costs: The cost assumes an increase in transit service by providing more express bus service to areas not currently served by transit. Passengers, miles per route, and number of routes were calculated and then combined with annual cost to arrive at a cost/ton.

Cost Effectiveness:
VOC: $1,014,862/ton
CO: $ 138,120/ton
NOx: $ 727,472/ton

Comments: Legislative authority may be needed in order to carry out the non-metro area transit. Since transit is contingent upon sales tax levied, only those areas that are in the sales tax area receive transit service.

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EMISSION CONTROL MEASURE (#17)
VEHICLE SCRAPPAGE

Control Measure Description: This control measure allows stationary sources to purchase high polluting vehicles that are identified by emissions testing and meet certain criteria in the Houston/Galveston nonattainment area. By purchasing these vehicles, stationary source can earn credits, which they can use to comply with federal and state regulations and to obtain offsets for future growth.

Control Measure Source: TNRCC, 30 TAC 114.29

Rule Effectiveness:
Control Efficiency:
Rule Penetration:

Source of Projected Emissions: High emitting, registered vehicles in the Houston/Galveston nonattainment area that have been driven for the past year.

Identified SCCs: N/A

Total Affected Emissions (adjusted 1999 EI): 99.67 TONS per Ozone Day

Affected Parties: The owners of vehicles that qualify to be scrapped, those entities that purchase the vehicles, and the entities that actually scrap the vehicles, such as a salvage yard, automotive dismantler or parts recycler.

Estimated Costs: To reduce 2 tpd of VOC (730 tons per year) and .64 tpd of NOx (234 tons per year), 13,140 vehicles would need to purchased. If each vehicle is purchased for $500, and assuming $50 per vehicle for an administrative fee, the total cost of the program would be approximately $7,227,000.

Cost Effectiveness: $ 9,900/ton of VOC in the first year
$30,885/ton of NOx in the first year
Assuming there is three years left in the remaining life of the vehicle that is scrapped, the cost spread over three years would be:
$ 3,300/ton of VOC
$10,295/ton of NOx

Comments: This is a variable program with its costs highly dependent upon how much credit a stationary source wants/needs and the purchase price of the scrapped vehicles.

Staff Contact: Andrea Griswold (512) 239-1761
Ruth Reiman (512) 239-1219

EMISSION CONTROL MEASURE (#18)
ELECTRIC LAWN AND GARDEN EQUIPMENT

Control Measure Description: This measure would require that lawn and garden equipment sold after January 1, 1999 in the Houston/Galveston nonattainment area be electric powered. Depending on the application, some internal combustion equipment would still be sold. Another version of the measure might provide local tax incentives to promote the purchase of electric equipment.

Control Measure Source: TNRCC

Rule Effectiveness: 15%
Control Efficiency: 100% Equipment would be zero emission. Some emissions would be transferred to power plants.
Rule Penetration: 15% EPA guidance indicates that 20% of the lawn and garden inventory is replaced each year. The price of electric equipment may slow purchases.

Source of Projected Emissions: Internal combustion engines 25 horsepower and less. These engines are used in a wide variety of applications, but the primary source of emissions is residential lawn and garden use. Light industrial uses include pumps, and small forklifts.

Identified SCCs: NA

Total Affected Emissions (adjusted 1999 EI): 90.74 tons per day VOC 13.15 tpd NOx

Affected Parties: Retailers would be required to stock electric equipment for most sales. Consumers may lose some convenience.

Estimated Costs: Estimated hours of use each year are 60 and the average power rating is 3 horsepower or 2.24 kW. Other estimates include a $60 increase in the price of an electric mower over a comparable powered gasoline model, an inventory of 717,000 mowers in the HGA nonattainment area, and a 15% average inventory turnover each year.

Cost Effectiveness: Total cost of $7,763,000 per yr and a VOC reduction of 13.61 tons per day or 4968 tons per year. Cost effectiveness is $1563 per ton VOC reduced.

Comments: There will be a slight increase in VOC emissions from electric power generation through the increased demand of the new equipment. The relative efficiency of the generating station makes this an insignificant number. There will also be an slight increase in NOx emissions from the power plants of 0.0005 tons per day or 0.1945 tons per year.

Manufacturers who already produce a large selection of electric powered equipment may be placed in a competitive advantage by this type of regulation. By providing ample lead time before implementation, other manufacturers will have time to expand their product line.

The VOC reduction is primarily gasoline vapor which has a health effect screening level of 3500 ppb for a one hour average. Mean incremental reactivity for the substances in gasoline is 2.

Staff Contact: Beecher Cameron (512) 239-1495.

Area Sources

EMISSION CONTROL MEASURE (#19)
ARCHITECTURAL COATINGS

Control Measure Description:	EPA was involved in regulation negotiation (reg-neg) for the development of a national architectural & industrial maintenance (AIM) coatings rule, which initially was expected to provide overall emission reductions of 25%. EPA now indicates that the reduction will be only about 15%. In order to take credit for reductions greater than the anticipated 15% reduction, the TNRCC must develop a rule to include about 30 coating categories with limits which are more stringent than those in the national rule. The rule would need to be statewide for maximum rule effectiveness.
Control Measure Source:	Reg-neg for EPA's national AIM coatings rule.
Rule Effectiveness:	N/A
Control Efficiency:	Under evaluation
Rule Penetration:	N/A
Source of Projected Emissions:	Industrial, commercial, and household use of AIM coatings.
Identified SCCs:	N/A
Total Affected Emissions (adjusted 1999 EI):	26.35 Tons per Ozone Day
Affected Parties:	This statewide rule would target the manufacturers of AIM coatings. Retailers and wholesalers would also be affected by the rule to the extent that they would be prohibited from selling or offering for sale any noncompliant AIM coatings.
Estimated Costs:	In some cases, compliant coatings are readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the AIM rule. The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to consumers. The cost of reformulated coatings is unknown.
Cost Effectiveness:	Unable to calculate since the cost of compliance is unknown.
Comments:	In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in AIM coatings.
Staff Contact:	Eddie Mack (239-1488)

EMISSION CONTROL MEASURE (#20)
BICYCLE LANES

Control Measure Description: Measures to encourage bicycle travel as a viable alternative transportation mode to the single occupant vehicle. This could reduce a trip entirely or be combined with another program, such as park and ride and mass transit.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington D.C., March 1992.

Some of the needed information was obtained from the Metropolitan Transportation Plan ACCESS 2010:1994 UPDATE prepared by the Houston-Galveston Area Council.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: Unknown at this time

Source of Projected Emissions: Bicycling has the potential of reducing emissions 100% for that particular trip. Bicycling could also be used in conjunction with transit or other forms of transportation.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Students, commuters, and recreation make up the majority of bicycle users. This program could be combined with trip reduction programs in the Houston/Galveston nonattainment area.

Estimated Costs:
Costs of this program includes developing a system of bicycle routes, lanes, and paths. Some of the facilities would be stripped from an existing facility while others would be constructed as dedicated lanes.

Cost Effectiveness:
VOC: $13,321,821/ton
NOx: $5,928,942/ton
CO: $1,371,079/ton

Comments: A progressive bicycle program is needed in order to get a measurable air quality benefit. The reduction of trips or VMT is a direct emissions reduction benefit if the program is used properly.

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04-27-95

EMISSION CONTROL MEASURE (#21)
OTHER SPECIAL PURPOSE COATINGS

Control Measure Description: EPA was involved in regulation negotiation (reg-neg) for the development of a national architectural & industrial maintenance (AIM) coatings rule, which initially was expected to provide overall emission reductions of 25%. EPA now indicates that the reduction will be only about 15%. In order to take credit for reductions greater than the anticipated 15% reduction, the TNRCC must develop a rule to include about 30 coating categories with limits which are more stringent than those in the national rule. The rule would need to be statewide for maximum rule effectiveness. EPA has been unable to define exactly what "other special purpose coatings" are, but these coatings appear to be included in the AIM rule.

Control Measure Source: Reg-neg for EPA's national AIM coatings rule.

Rule Effectiveness: N/A
Control Efficiency: Under evaluation
Rule Penetration: N/A;

Source of Projected Emissions: Industrial, commercial, and household use of "other special purpose coatings."
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 4.55 Tons per Ozone Day

Affected Parties: This statewide rule would target the manufacturers of AIM coatings (including "other special purpose coatings"). Retailers and wholesalers would also be affected by the rule to the extent that they would be prohibited from selling or offering for sale any noncompliant AIM coatings.

Estimated Costs: In some cases, compliant coatings are readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule. The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to consumers.

Cost Effectiveness: Unable to calculate since the cost of compliance is unknown. A very cost-effective option is to delete these categories from the 1996 emissions inventory, which would in effect provide a 100% reduction in these emissions.

Comments: In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in AIM coatings.

Staff Contact: Eddie Mack (239-1488)

EMISSION CONTROL MEASURE (#22)
TRAFFIC MARKINGS

Control Measure Description: EPA was involved in regulation negotiation (reg-neg) for the development of a national architectural & industrial maintenance (AIM) coatings rule, which initially was expected to provide overall emission reductions of 25%. EPA now indicates that the reduction will be only about 15%. In order to take credit for reductions greater than the anticipated 15% reduction, the TNRCC must develop a rule to include about 30 coating categories with limits which are more stringent than those in the national rule. The rule would need to be statewide for maximum rule effectiveness. Traffic markings are included in EPA's AIM coatings rule.

Control Measure Source: Reg-neg for EPA's national AIM coatings rule.

Rule Effectiveness: N/A
Control Efficiency: Under evaluation
Rule Penetration: N/A;

Source of Projected Emissions: TxDOT; city and county road departments; and parking lot striping companies.
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 2.18 Tons per Ozone Day

Affected Parties: This statewide rule would target the manufacturers of AIM coatings (including traffic markings). Retailers and wholesalers would also be affected by the rule to the extent that they would be prohibited from selling or offering for sale any noncompliant AIM coatings. TxDOT, city & county road departments, and parking lot striping companies would also be affected.

Estimated Costs: Waterborne traffic markings are available and are currently being used by TxDOT. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule. The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to their customers.

Cost Effectiveness: Unable to calculate since the cost of compliance is unknown. Expected to be fairly cost-effective since TxDOT has voluntarily switched to compliant waterborne coatings.

Comments: In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in AIM coatings.

Staff Contact: Eddie Mack (239-1488)

EMISSION CONTROL MEASURE (#23)
PARKING MANAGEMENT
(EMPLOYER-BASED)

Control Measure Description: A program to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use; and programs and ordinances to facilitate non-automobile travel, etc. Parking management strategies can include preferential parking for HOV, public sector pricing, and control of parking supply.

Control Measure Source: Loudon, William R., Deborah A. Dagang, and Robert Dulla, "The Effectiveness of Transportation Control Measures in Reducing Congestion and Improving Air Quality." Air and Waste Management Association. Denver, CO. June 1993.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: Unknown at this time

Source of Projected Emissions: Vehicles driving to and from the work site in areas with high concentrations of emissions, especially during peak use.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: This program primarily effects persons riding in single-occupant vehicles parking in dense or highly congested areas.

Estimated Costs: Cost includes providing enforcement action to the parking program.

Cost Effectiveness:
VOC: $101,430/ton
CO: $10,605/ton
NOx: $47,540/ton

Comments: Parking management strategies are most effective when implemented in dense CBDs that have limited available parking. If there is an excess of parking, this will diminish the effectiveness of the parking management program. Parking Management can be an effective tool for local government to reduce traffic and associated emissions in congested areas by encouraging travelers to use modes other than driving alone. Three strategies can be applied with the public sector: preferential parking policies for high occupancy vehicles (HOV); public sector pricing policies; and control of parking supply.

Parking management has the potential of reducing peak period trips by 6.25% and off-peak trips by 2.6%. This is due to the elimination of trips.

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EMISSION CONTROL MEASURE (#24) TELECOMMUTING (HOME-BASED WORK SITE)

Control Measure Description: Telecommuting is working at a location other than one's usual office, and therefore avoiding the trip to the office, while performing the same duties as would otherwise be performed in the central office. For this analysis, home as the work site was evaluated.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington D.C., March 1992.

Information obtained to estimate certain aspects of this program were derived from staff's estimation of the programs start-up and daily operating costs.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: unknown at this time

Source of Projected Emissions: This program could either be for the entire Houston/Galveston ozone nonattainment area or could be in areas of higher concentration of vehicular traffic.

Since we are analyzing this program from an at-home perspective, we have calculated emissions generated from a secondary use of the vehicle.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Telecommuting is widely used by many employers, both large and small, on a national scale. Telecommuting is favored because it allows the employee to work at home on a flexible schedule. This could be used as part of the ETR program.

Estimated Costs: Equipment and computer hook-up have been calculated as part of the overall cost of the program. The cost effectiveness below considers VMT saved minus secondary use of vehicle plus cost to employer. The calculation also takes into consideration volume and average trip length.

Cost Effectiveness:
VOC: $86,088/ton
CO: $11,591/ton
NOx: $49,580/ton

Comments: A reduction in vehicle trips due to this program could and would have positive air quality benefits to the area. Positive air quality benefits include reduced trips and VMT during peak and non-peak periods and reduced hot and cold starts. Unfortunately, a thorough survey of employees and employers would need to be conducted in order to assist in the evaluation of this program.

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04-27-95

EMISSION CONTROL MEASURE (#25)
FLEXIBLE WORK SCHEDULES

Control Measure Description: To reduce the volume of commute travel during peak periods and to change work schedules to provide greater flexibility.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: unknown at this time

Source of Projected Emissions: Vehicular emissions from employees continuing to drive to work except at different times. Overall emissions may rise or fall depending on success of program. Congestion relief will probably have a positive air quality benefit on VOC's but may have a negative effect on NOx reductions.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Flexible work schedules are widely used by many employers, both large and small nationwide. This TCM allows the employee to work a full time schedule with the flexibility to arrange the hours. This program could be used in the Houston/Galveston nonattainment area or could be modified to the highest congested areas, for example Harris County.

Estimated Costs: Cost for this program has not yet been determined because of the lack of information about employee involvement. Set schedules are not easily obtainable due to the flexibility of the program.

Cost Effectiveness:
VOC: $49,515/ton
NOx: neg. benefit
CO: $ 5,765/ton

Comments: This program can be combined with the ETR program. Flexible work schedules may provide greater flexibility in arrival and departure times to support ridesharing activities. Positive air quality impacts include reduced peak period congestion. Negative impacts may be that flexible work schedules cause some transit users to drive alone, thus offsetting the initial benefit.

Changing the time the employee arrives at the work site could change the concentration of ozone precursors being emitted from those vehicles. This might aid in the reduction of ozone. Unfortunately, the pollution reduction benefits are so small for the cost associated with this program.

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05-01-95

EMISSION CONTROL MEASURE (#26)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAHPIC PROCESSSES: Publication Flexography)

Control Measure Description: Use of catalytic incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A245040000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of publication flexography facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Catalytic Incinerators:10 TPY (10% LEL only)= $110,000; 25 TPY (10% LEL)= $120,000-$170,000; 50 TPY (25% LEL only)= $110,000-$150,000 & (10% LEL)= $180,000-$250,000; 100 TPY (25% LEL)= $150,000-$220,000 & (10% LEL)= $250,000-$370,000; 1,000 TPY (25% LEL)= $340,000 & (10% LEL)= $690,000.

Cost Effectiveness: 10 TPY (10% LEL)= $ 3,900; 25 TPY (10% LEL)= $2,500-$2,800; 50 TPY (25% LEL)= $ 980-$1,100 & (10% LEL)= $1,800-$2,000; 100 TPY (25% LEL)= $1,200- 1,300 & (10% LEL)= $1,400-$1,600; 1000 TPY (25% LEL)= $180 & (10% LEL)= $350. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink**: Benzisothiazolinon, ethylenediamine, ammonium hydroxide, antimicrobial agents, isopropanol, toluene, **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene. **Wash Solution**: ethylene glycol monethyl ether, amines, ammonia. "Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, 512-239-1054

EMISSION CONTROL MEASURE (#27)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAHPIC PROCESSSES: Publication Flexography)

Control Measure Description: Use of carbon adsorption system to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A245040000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of publication flexography facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Carbon Adsorption Systems:50 TPY (25% LEL only)= $77,000 & (10% LEL)= $77,000; 100 TPY (25% LEL)= $110,000 & (10% LEL)= $110,000; 1,000 TPY (25% LEL)= $330,000 & (10% LEL)= $330,000.

Cost Effectiveness: 50 TPY (25% LEL)= $760 & (10% LEL)= $780; 100 TPY (25% LEL)= $450 & (10% LEL)= $460; 1000 TPY (25% LEL)= $120 & (10% LEL)= $120. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink**: Benzisothiazolinon, ethylenediamine, ammonium hydroxide, antimicrobial agents, isopropanol, toluene, **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene. **Wash Solution**: ethylene glycol monethyl ether, amines, ammonia. "Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, (512) 239-1054

EMISSION CONTROL MEASURE (#28)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAHPIC PROCESSSES: Packaging Flexography)

Control Measure Description: Use of thermal incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A245040000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging flexography facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Thermal Incinerators:10 TPY= $99,000; 25 TPY= $99,000; 50 TPY= $120,800; 100 TPY= $130,800; 1,000 TPY= $360,000

Cost Effectiveness: 10 TPY= $3,500-$4,800; 25 TPY $2,500-$3,000; 50 TPY= $1,200-$2,400; 100 TPY= $850-$2,000; 1000 TPY= $170-$480. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink**: Benzisothiazolinon, ethylenediamine, ammonium hydroxide, antimicrobial agents, isopropanol, toluene, n-propanol, n-propyl acetate, ethyl alcohol, n-heptane. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol, methyl isobutyl ketone, diethylene glycol ether, methyl ethyl ketone. **Wash Solution**: ethylene glycol monethyl ether, amines, ammonia. "Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, (512) 239-1054

EMISSION CONTROL MEASURE (#29)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Packaging Flexography)

Control Measure Description: Use of catalytic incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A245040000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging flexography facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Catalytic Incinerators:10 TPY (10% LEL only)= $110,000; 25 TPY (10% LEL)= $120,000-$170,000; 50 TPY (25% LEL only)= $110,000-$150,000 & (10% LEL)= $180,000-$250,000; 100 TPY (25% LEL)= $150,000-$220,000 & (10% LEL)= $250,000-$370,000; 1,000 TPY (25% LEL)= $340,000 & (10% LEL)= $690,000.

Cost Effectiveness: 10 TPY (10% LEL)= $ 3,900; 25 TPY (10% LEL)= $2,500-$2,800; 50 TPY (25% LEL)= $ 980-$1,100 & (10% LEL)= $1,800-$2,000; 100 TPY (25% LEL)= $1,200- 1,300 & (10% LEL)= $1,400-$1,600; 1000 TPY (25% LEL)= $180 & (10% LEL)= $350. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink**: Benzisothiazolinon, ethylenediamine, ammonium hydroxide, antimicrobial agents, isopropanol, toluene, n-propanol, n=propyl acetate, ethyl alcohol, n-heptane. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol, methyl isobutyl ketone, diethylene glycol ether, methyl ethyl ketone. **Wash Solution**: ethylene glycol monethyl ether, amines, ammonia. "Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, (512) 239-1054

EMISSION CONTROL MEASURE (#30)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Packaging Flexography)

Control Measure Description: Use of carbon adsorption system to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A245040000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging flexography facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Carbon Adsorption Systems:50 TPY (25% LEL only)= $77,000 & (10% LEL)= $77,000; 100 TPY (25% LEL)= $110,000 & (10% LEL)= $110,000; 1,000 TPY (25% LEL)= $330,000 & (10% LEL)= $330,000.

Cost Effectiveness: 50 TPY (25% LEL)= $760 & (10% LEL)= $780; 100 TPY (25% LEL)= $450 & (10% LEL)= $460; 1000 TPY (25% LEL)= $120 & (10% LEL)= $120. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink**: Benzisothiazolinon, ethylenediamine, ammonium hydroxide, antimicrobial agents, isopropanol, toluene, n-propanol, n-propyl acetate, ethyl alcohol, n-heptane. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol, methyl isobutyl ketone, diethylene glycol ether, methyl ethyl ketone. **Wash Solution**: ethylene glycol monethyl ether, amines, ammonia. "Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, (512) 239-1054

EMISSION CONTROL MEASURE (#31)
CONTROL OF TRUCK MOVEMENTS

Control Measure Description: Controlling or restricting heavy duty trucks from certain hours of the day in certain areas or on certain facility types (excluding freeway).

Control Measure Source: United State Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: unknown at this time

Source of Projected Emissions: Emissions generated from heavy duty trucks operating during peak periods.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Truck drivers, freight and delivery companies operating in the eight county Houston/Galveston nonattainment area.

Estimated Costs: Estimated costs to this program include enforcement of truck movements in the peak hours.

Cost Effectiveness:
VOC: $47,628/ton
CO: $ 6,608/ton
NOx: $ 554/ton

Comments: Controlling movements in certain areas can be very beneficial in reducing congestion and the associated pollution generated from this control. Shifting peak period truck movements could have a negative effect on air quality. If the trucks are being banned from peak hour use, this shifts traffic to different operating hours which may cause problems in those time periods. This could result in slightly negative air quality impacts.

Also, removing trucks from peak use could increase overall facility operating speeds which may lead to lower VOC levels but slightly higher NOx levels.

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05-01-95

EMISSION CONTROL MEASURE (#32)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Packaging Gravure)

Control Measure Description: Use of thermal incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Thermal Incinerators:10 TPY= $99,000; 25 TPY= $99,000; 50 TPY= $120,800; 100 TPY= $130,800; 1,000 TPY= $360,000

Cost Effectiveness: 10 TPY= $3,500-$4,800; 25 TPY $2,500-$3,000; 50 TPY= $1,200-$2,400; 100 TPY= $850-$2,000; 1000 TPY= $170-$480. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, isopropyl acetate, n-propyl acetate, butyl acetate, n-butyl acetate, ethylene glycol monoethyl ether, methanol, ethanol, isopropanol, tri-decanol. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

Staff Contact: Thomas C. Ortiz, (512) 239-1054

EMISSION CONTROL MEASURE (#33)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Publication Gravure)

Control Measure Description: Use of thermal incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of publication gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Thermal Incinerators:10 TPY= $99,000; 25 TPY= $99,000; 50 TPY= $120,800; 100 TPY= $130,800; 1,000 TPY= $360,000

Cost Effectiveness: 10 TPY= $3,500-$4,800; 25 TPY $2,000-$3,000; 50 TPY= $1,200-$2,400; 100 TPY= $850-$2,000; 1000 TPY= $170-$480. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, hexane, heptane, mineral spirits, lactol spirits, petroleum naptha, VM&P naptha, & alcohols. **Wash solvent**: Toluene, aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#34)
CONTROL OF EXTENDED VEHICLE IDLING
RESTRICT DRIVE THRUS AND TOLL BOOTHS

Control Measure Description: Measures to reduce the amount of time which vehicles spend in idle mode as part of their overall operation. This includes drive-thru and toll booth operations, as well as heavy-duty diesel idling.

Control Measure Source: United States Environmental Protection Agency Office of Air and Radiation, "Transportation Control Measures Information Documents," Washington D.C., March 1992.

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: unknown at this time

Source of Projected Emissions: Tailpipe emissions generated as a result of vehicle idling. Includes passenger (LDG and LDD) and heavy duty vehicles. Reductions in idle time emissions are the product of the idle emission rate, in grams per hour, and the number of hours per day in reduced idling time. Sources of projected emissions include drive-thru, toll booth, curbside, and heavy-duty bus/truck idle.

Identified SCCs: N/A

Total Emissions affected in 1990 EI: 99.76 tons per ozone day

Affected Parties: Controls on construction and operation of drive-thru facilities such as banks and fast food restaurants; controls on toll booth design and operation; controls on extended vehicle idling during layover time, particularly of diesel engines used by transit vehicles, delivery trucks, and interstate freight trucks.

Estimated Costs: These costs are based on hours of operation, equipment costs, start up costs, salaries for potential employees, etc.

Cost Effectiveness:
Toll booths: VOC $57,155/ton CO $6,705/ton NOx $178,583/ton
Drive Thru Windows: VOC $31,062/ton CO $3,644/ton NOx $97,056/ton
Heavy Duty Diesel Idling: VOC $5,285/ton CO $714/ton NOx $1,178/ton

Comments: Laws can be enacted to limit idle time of heavy-duty vehicles if the vehicle is not performing useful work. Time limits can be set by the legislature. Also, drive-up window design can be modified as to minimize idling or queue time. New technologies for toll booth operations minimize or eliminate idle time completely.

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5-01-95

EMISSION CONTROL MEASURE (#35)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Product Gravure)

Control Measure Description: Use of catalytic incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of product gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Catalytic Incinerators:10 TPY (10% LEL only)= $110,000; 25 TPY (10% LEL)= $120,000-$170,000; 50 TPY (25% LEL only)= $110,000-$150,000 & (10% LEL)= $180,000-$250,000; 100 TPY (25% LEL)= $150,000-$220,000 & (10% LEL)= $250,000-$370,000; 1,000 TPY (25% LEL)= $340,000 & (10% LEL)= $690,000.
Cost Effectiveness: 10 TPY (10% LEL)= $ 3,900; 25 TPY (10% LEL)= $2,500-$2,800; 50 TPY (25% LEL)= $ 980-$1,100 & (10% LEL)= $1,800-$2,000; 100 TPY (25% LEL)= $1,200- 1,300 & (10% LEL)= $1,400-$1,600; 1000 TPY (25% LEL)= $180 & (10% LEL)= $350. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, isopropyl acetate, n-butyl acetate, ethylene glycol monoethyl ether, methanol, ethanol, isopropanol, tri-decanol. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#36)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Packaging Gravure)

Control Measure Description: Use of catalytic incinerators to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 10 TPY= $4,000; 25 TPY= $4,000; 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Catalytic Incinerators:10 TPY (10% LEL only)= $110,000; 25 TPY (10% LEL)= $120,000-$170,000; 50 TPY (25% LEL only)= $110,000-$150,000 & (10% LEL)= $180,000-$250,000; 100 TPY (25% LEL)= $150,000-$220,000 & (10% LEL)= $250,000-$370,000; 1,000 TPY (25% LEL)= $340,000 & (10% LEL)= $690,000.

Cost Effectiveness: 10 TPY (10% LEL)= $ 3,900; 25 TPY (10% LEL)= $2,500-$2,800; 50 TPY (25% LEL)= $ 980-$1,100 & (10% LEL)= $1,800-$2,000; 100 TPY (25% LEL)= $1,200- 1,300 & (10% LEL)= $1,400-$1,600; 1000 TPY (25% LEL)= $180 & (10% LEL)= $350. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, isopropyl acetate, n-propyl acetate, butyl acetate, n-butyl acetate, ethylene glycol monoethyl ether, methanol, ethanol, isopropanol, tri-decanol. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#37)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Publication Gravure)

Control Measure Description: Use of carbon adsorption system to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of publication gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Carbon Adsorption Systems:50 TPY (25% LEL only)= $77,000 & (10% LEL)= $77,000; 100 TPY (25% LEL)= $110,000 & (10% LEL)= $110,000; 1,000 TPY (25% LEL)= $330,000 & (10% LEL)= $330,000.
Cost Effectiveness: 50 TPY (25% LEL)= $760 & (10% LEL)= $780; 100 TPY (25% LEL)= $450 & (10% LEL)= $460; 1000 TPY (25% LEL)= $120 & (10% LEL)= $120. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, hexane, heptane, mineral spirits, lactol spirits, petroleum naptha, VM&P naptha, & alcohols. **Wash solvent**: Toluene, aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#38)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Packaging Gravure)

Control Measure Description: Use of carbon adsorption system to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of packaging gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Carbon Adsorption Systems:50 TPY (25% LEL only)= $77,000 & (10% LEL)= $77,000; 100 TPY (25% LEL)= $110,000 & (10% LEL)= $110,000; 1,000 TPY (25% LEL)= $330,000 & (10% LEL)= $330,000.

Cost Effectiveness: 50 TPY (25% LEL)= $760 & (10% LEL)= $780; 100 TPY (25% LEL)= $450 & (10% LEL)= $460; 1000 TPY (25% LEL)= $120 & (10% LEL)= $120. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, isopropyl acetate, n-propyl acetate, butyl acetate, n-butyl acetate, ethylene glycol monoethyl ether, methanol, ethanol, isopropanol, tri-decanol.
Wash solvent: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#39)
(GRAPHIC ARTS: ROTOGRAVURE & FLEXOGRAPHIC PROCESSES: Product Gravure)

Control Measure Description: Use of carbon adsorption system to control VOC emissions & total enclosure capture systems. 30 TAC §115.432 will be impacted by this requirement.

Control Measure Source: "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration:

Source of Projected Emissions: Solvent use in inks and general process.
Identified SCCs: 405003, 40500301, 405005, 40500501, A2425030000
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of product gravure facilities

Estimated Costs: Plant size (ton/year of total solvent use):Total Enclosure (1991 $): 50 TPY= $6,800; 100 TPY= $6,800; 1,000 TPY= $19,000
Carbon Adsorption Systems:50 TPY (25% LEL only)= $77,000 & (10% LEL)= $77,000; 100 TPY (25% LEL)= $110,000 & (10% LEL)= $110,000; 1,000 TPY (25% LEL)= $330,000 & (10% LEL)= $330,000.

Cost Effectiveness: 50 TPY (25% LEL)= $760 & (10% LEL)= $780; 100 TPY (25% LEL)= $450 & (10% LEL)= $460; 1000 TPY (25% LEL)= $120 & (10% LEL)= $120. (without enclosure cost) "Alternative VOC Control Technique Options for Small Rotogravure and Flexographic Facilities", EPA-600/R-92-20 October 1992.

Comments: **Ink, varnish**: Toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, isopropyl acetate, n-butyl acetate, ethylene glycol monoethyl ether, methanol, ethanol, isopropanol, tri-decanol. **Wash solvent**: aliphatic and aromatic hydrocarbons, ethanol, mineral spirits, acetone, toluene, isopropanol."Printing Industry and Use Cluster Profile", USEPA 744-R-94-003 June 1994.

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EMISSION CONTROL MEASURE (#40)
(Offset Lithographic Printing - Fountain Solution)

Control Measure Description:	Require the installation of magnets within the fountain solution tank. This would impact the compliance options found in §115.442. Assumption that 3% IPA fountain solution is used for startup & without refrigeration.
Control Measure Source:	"Draft Offset Lithographic Printing Control Techniques Guideline", USEPA, Chemicals and Petroleum Branch, Research Triangle Park, North Carolina.
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	99%
Source of Projected Emissions:	Offset printers will reduce the amount of fountain solution used thus reducing VOCs and sources will be able to use solutions with lower VOC content.
Identified SCCs:	405004, 40500401, 40500411, 40500412, 40500413
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.
Estimated Costs:	**Capital** Costs: Heatset Web Model Plants: (5 units= $1,750); (11 units= $3,850); (22 units= $7,700); (40 units= $14,000) Heatset Web Model Plants: (5 units= $1,750); (11 units= $3,850); (22 units= $7,700); (40 units= $14,000) Non-heatset Sheet Model Plants: (3 units= $1,050); (5 units= $1,750); (16 units= $5,600); (36 units= $12,600) Newspaper (non-heatset web) Model Plants: (6 units= $2,100); (9 units= $3,150); (17 units= $5,950); (33 units= $11,550); (68 units= $23,800); (110 units= $38,500). **Annual** Costs: Heatset Web Model Plants: (5 units= $355); (11 units= $781); (22 units= $1,561); (40 units= $2,839) Heatset Web Model Plants: (5 units= $355); (11 units= $781); (22 units= $1,561); (40 units= $2,839) Non-heatset Sheet Model Plants: (3 units= $213); (5 units= $355); (16 units= $1,135); (36 units= $2,555) Newspaper (non-heatset web) Model Plants: (6 units= $426); (9 units= $639); (17 units= $1,206); (33 units= $2,342); (68 units= $4,825); (110 units= $7,806). ("Draft Offset Lithographic Printing Control Techniques Guideline", p.6-16)
Cost Effectiveness:	Heatset Web Model Plants:(5 units= $30); (11 units= $38); (22 units= $30); (40 units= $30) Non-Heatset Web Model Plants: (5 units= $21); (11 units= $22); (22 units= $22); (40 units= $22) Non-heatset Sheet Model Plants:(3 units= $1,050); (5 units= $921); (16 units= $903); (36 units= $906) (Facility size breakdown in "Draft Offset Lithographic Printing Control Techniques Guideline", p.6-16 and emission reduction estimates from p.5-9)

Comments:	**Heatset Web Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol **Nonheatset Web Fountain Solution**: Isopropanol, 2-butoxy ethanol, gum arabic, dextrin, phosphate dipropylene glycol, synthetic cellulose. **Nonheatset Sheet Fed Fountain** Solution: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol. "Printing Industry and Use Cluster Profile" USEPA, June 1994.
Staff Contact:	Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#41)
(Offset Lithographic Printing -
Add-on Controls to dryers)

Control Measure Description: Require the installation of catalytic oxidizers with 95% VOC destruction efficiency for all heatset web offset lithographic printing presses. This action replaces the compliance requirement found in §115.442(2).

Control Measure Source: Draft "Offset Lithographic Printing Control Techniques Guideline", USEPA, Chemicals and Petroleum Branch, September 6, 1991.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration:

Source of Projected Emissions: total VOC emissions from press operation.
Identified SCCs: 40500101 or 40500199
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.

Estimated Costs: Heatset Web Model Plants:(4-6 units= $191,697); (6-16 units= $392,639); (12-32 units= $748,930); & (32-48 units= $931,492)

Cost Effectiveness: Heatset Web Model Plants:(4-6 units= $7921); (6-16 units= $ 7366); (12-32 units= $ 7025); & (32-48 units= $ 4806)

Comments: **Ink, varnish**: Petroleum distillates, vegetable oils, resin, rosin, dryer, pigments containing barium and copper. **Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol.

The cost effectiveness estimates above do not include direct and indirect carryover of VOCs from cleaning solvents and fountain solutions into the heatset dryers. For automatic blanket wash systems, direct capture averaged around 40% for the test facilities when the vapor pressure of the cleaning material is less than 10mm Hg @ 20°C. Direct capture of VOC from fountain solutions was about 70%. Indirect capture is probable yet too difficult to estimate.

Staff Contact: Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#42)
(Offset Lithographic Printing - Fountain Solution)

Control Measure Description:	Require the operation of waterless plates in lithographic printing. This would impact the compliance options found in §115.442 (1)(A)(C)(D)(E).
Control Measure Source:	"Printing Industry and Use Cluster Profile", USEPA, Prevention, Pesticides, and Toxic Substances, EPA 744-R-94-003, June 1994.
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	99%
Source of Projected Emissions: **Identified SCCs:** **Total Affected Emissions (adjusted 1999 EI):**	Offset printers will no longer use fountain solution for print operations. 405004, 40500401, 40500411, 40500412, 40500413
Affected Parties:	Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.
Estimated Costs:	Capital Costs: $40,000 processors, $60,000-$100,000 chillers. Annual maintenance: increased plate use due to durability decreases. Operating Costs: increased cost of waterless inks & increased energy costs in chiller operation Social & Indirect Costs: technology has increased energy requirements and the waterless plate development is solvent based. ("Printing Industry and Use Cluster Profile", p.2-99.) There are also changeover costs which will vary from facility to facility.
Cost Effectiveness:	Heatset Web Model Plants:(4-6 units= $1,428-$2,000); (6-16 units= $653-$915); (12-32 units= $326-$457); & (32-48 units= $179-$251) Non-Heatset Web Model Plants: (4-6 units= $1,030-$1,443); (6-16 units= $471-$660); (12-32 units= $235-$329); & (32-48 units= $129-$181) Non-heatset Sheet Model Plants: (1-4 units= $83,333-$116,666); (2-8 units= $43,478-$60869); (8-24 units= $13,333-$18,666); & (24-48 units= $5,917-$8284) (Facility size breakdown in "Draft Offset Lithographic Printing Control Techniques Guideline")

Comments:	**Heatset Web Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol **Nonheatset Web Fountain Solution**: Isopropanol, 2-butoxy ethanol, gum arabic, dextrin, phosphate dipropylene glycol, synthetic cellulose. **Nonheatset Sheet Fed Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol. "Printing Industry and Use Cluster Profile" USEPA, June 1994.
Staff Contact:	Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#43)
(Offset Lithographic Printing - Cleaning Solvents for Non-Heatset & Sheetfed Processes Only)

Control Measure Description: Require the use of lithographic ink that can be cleaned with water. This particular technology comes from the Deluxe Corporation who had used the ink in over 40 of their facilities since 1993.

Control Measure Source: "Alternative Control Techniques Document: Offset Lithographic Printing" USEPA, Office or Air Quality Planning and Standards, EPA 453/R-94-054, June 1994.

Rule Effectiveness: 99%
Control Efficiency:
Rule Penetration:

Source of Projected Emissions: Cleaning solutions that are used during press operation.
Identified SCCs: 405004, 40500401, 40500411, 4050012, 40500413
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.

Estimated Costs:

Cost Effectiveness:

Comments: **Sheetfed**: aliphatic and aromatic hydrocarbons, mineral spirits, acetone, methylene chloride, xylene, toluene, glycol ethers, vegetable oils, fatty acids, surfactants. **Nonheatset Web**: aliphatic and aromatic hydrocarbons, mineral spirits, acetone, glycol ethers, vegetable oils, fatty acids. "Printing Industry and Use Cluster Profile", USEPA, June 1994.

Staff Contact: Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#44)
(Offset Lithographic Printing - Cleaning Solvents 2)

Control Measure Description: Solvents used in lithographic printing shall have a VOC content of 900 grams or less of VOC per liter and a VOC composite partial pressure of 10 mm Hg @ 20°C.

Control Measure Source: South Coast Air Quality Management District Rule 1171 Solvent Cleaning Operation (adopted August 2, 1991) Rule 1171 (c)(1)(E)(ii).

Rule Effectiveness: 99%
Control Efficiency:
Rule Penetration:

Source of Projected Emissions: Cleaning solutions that are used during press operation.
Identified SCCs: 405004, 40500401, 40500411, 4050012, 40500413
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.

Estimated Costs:

Cost Effectiveness:

Comments: "The use of cleaning material with a VOC composite partial vapor pressure less than 10 mm Hg @ 20°C would result in comparable emission reduction to using cleaning materials that contain less than 30 weight VOC." (Alternate Control Techniques: Offset Lithographic Printing, p.6) "The VOC composite partial vapor pressure of most cleaning materials used to meet the SCAQMD requirement is less than 10 mm Hg @ 20°C. The VOC composite partial pressure of solvents used in automatic blanket washing systems is commonly less than 6 mm Hg @ 20°C. "(Alternate Control Techniques: Offset Lithographic Printing, p.6)

Sheetfed: aliphatic and aromatic hydrocarbons, mineral spirits, acetone, methylene chloride, xylene, toluene, glycol ethers, vegetable oils, fatty acids, surfactants. **Heatset Web**: all of the above plus isopropanol. **Nonheatset Web**: aliphatic and aromatic hydrocarbons, mineral spirits, acetone, glycol ethers, vegetable oils, fatty acids. "Printing Industry and Use Cluster Profile", USEPA, June 1994.

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EMISSION CONTROL MEASURE (#45)
(Offset Lithographic Printing - Add-on Controls to dryers)

Control Measure Description: Require the addition of activated carbon canisters on the outlet of the filter exhaust of any condenser filter systems installed on heatset offset lithographic printing presses. This action adds to the compliance requirement found in §115.442(2).

Control Measure Source: Draft "Offset Lithographic Printing Control Techniques Guideline", USEPA, Chemicals and Petroleum Branch, September 6, 1991.

Rule Effectiveness: 99%
Control Efficiency: adds 5% to the required 90% control efficiency.
Rule Penetration:

Source of Projected Emissions: total VOC emissions from press operation.
Identified SCCs: 40500101 or 40500199
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.

Estimated Costs: Heatset Web Model Plants:(4-6 units= $229,316); (6-16 units= $383,877); (12-32 units= $735,968); & (32-48 units= $1,085,771)

Cost Effectiveness: Heatset Web Model Plants:(4-6 units= $ 9758); (6-16 units= $ 7425); (12-32 units= $ 7124); & (32-48 units= $ 5778)

Comments: **Ink, varnish**: Petroleum distillates, vegetable oils, resin, rosin, dryer, pigments containing barium and copper **Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol.

The cost effectiveness estimates above do not include direct and indirect carryover of VOCs from cleaning solvents and fountain solutions into the heatset dryers. For automatic blanket wash systems, direct capture averaged around 40% for the test facilities when the vapor pressure of the cleaning material is less than 10mm Hg @ 20°C. Direct capture of VOC from fountain solutions was about 70%. Indirect capture is probable yet too difficult to estimate.

Staff Contact: Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#46)
(Offset Lithographic Printing - Add-on Controls to dryers)

Control Measure Description: Require the installation of thermal incinerators with 98% VOC destruction efficiency for all heatset web offset lithographic printing presses. This action replaces the compliance requirement found in §115.442(2).

Control Measure Source: Draft "Offset Lithographic Printing Control Techniques Guideline", USEPA, Chemicals and Petroleum Branch, September 6, 1991.

Rule Effectiveness: 99%
Control Efficiency: 98% (currently 90%)
Rule Penetration:

Source of Projected Emissions: total VOC emissions from press operation.
Identified SCCs: 40500101 or 40500199
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Industries: Printing Industry (SIC 27); Nonattainment areas: D/FW, El Paso, & H/G; Associations: Printing Industries Association of Texas & Printing Industries of the Gulf Coast.

Estimated Costs: Heatset Web Model Plants:(4-6 units= $174,123); (6-16 units= $368,733); (12-32 units= $568,469); & (32-48 units= $632,737)

Cost Effectiveness: Heatset Web Model Plants:(4-6 units= $ 7195); (6-16 units= $ 6918); (12-32 units= $ 5332); & (32-48 units= $ 3264)

Comments: **Ink, varnish**: Petroleum distillates, vegetable oils, resin, rosin, dryer, pigments containing barium and copper. **Fountain Solution**: Isopropanol, 2-butoxy ethanol and other glycol ethers, gum arabic, phosphoric acid, ethylene glycol.

The cost effectiveness estimates above do not include direct and indirect carryover of VOCs from cleaning solvents and fountain solutions into the heatset dryers. For automatic blanket wash systems, direct capture averaged around 40% for the test facilities when the vapor pressure of the cleaning material is less than 10mm Hg @ 20°C. Direct capture of VOC from fountain solutions was about 70%. Indirect capture is probable yet too difficult to estimate.

Staff Contact: Thomas C. Ortiz (512) 239-1054

EMISSION CONTROL MEASURE (#47)
FURNITURE & FIXTURES SURFACE COATING

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline (CTG) document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency. In addition, EPA has proposed an MACT standard for the wood furniture industry which may provide emission reductions beyond those achieved by the TNRCC's current rule (reductions are undetermined at this time).

Control Measure Source: EPA's draft Control Techniques Guideline (CTG) document; negotiations for TNRCC's current rule.

Rule Effectiveness: 99%
Control Efficiency: up to about 30% (currently 20%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Furniture/fixtures surface coating
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 2.64 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to wood furniture/fixtures. Coating manufacturers would also be affected because they would have to produce compliant coatings for sale to affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per HVLP spray gun or equivalent.

Cost Effectiveness: A change in the TNRCC coating limits is likely to have a high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective. For Beaumont/Port Arthur (BPA), a cost-effective option is extension of the existing Reg. V rule to BPA. Taking credit for EPA's MACT (when actual reductions are known) is another option.

Comments:	In order of decreasing emission rates, VOCs emitted from typical wood furniture surface coating processes consist of toluene (26.5%); xylene (15.0%); ethanol (10.2%); butanol (10.2%); MIBK (7.3%); IPA (5.7%); MEK (5.6%); butyl acetates (5.3%); aromatics other than xylene & toluene (3.4%); miscellaneous aliphatic VOCs (3.2%); ethyl acetate (2.9%); glycol ethers (1.7%); miscellaneous VOCs (3.0%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in surface coating unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.
Staff Contact:	Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#48)
MACHINERY & EQUIPMENT SURFACE COATING

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline (CTG) document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency.

Control Measure Source: EPA's CTG document.

Rule Effectiveness: 99%
Control Efficiency: up to about 65% (currently 55.6%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Coatings and solvents used in surface coating of machinery and equipment. (Note: these are product coatings, rather than architectural & industrial maintenance (AIM) coatings)
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 1.84 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to machinery and equipment. Coating manufacturers would also be affected by the rule because they would have to produce compliant coatings for sale to the affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per high-volume low-pressure (HVLP) spray gun or equivalent.

Cost Effectiveness: A change in coating limits is likely to have a very high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective.

Comments:	In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in surface coating unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.
Staff Contact:	Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#49)
MISCELLANEOUS METAL PARTS & PRODUCTS SURFACE COATING

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline (CTG) document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency.

Control Measure Source: EPA's CTG document.

Rule Effectiveness: 99%
Control Efficiency: up to about 65% (currently 55.6%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Coatings and solvents used in surface coating of miscellaneous metal parts and products.
Identified SCCs: 4-02-025-xx and 4-02-026-xx
Total Affected Emissions (adjusted 1999 EI): 1.43 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to miscellaneous metal parts and products. Coating manufacturers would also be affected by the rule because they would have to produce compliant coatings for sale to the affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per high-volume low-pressure (HVLP) spray gun or equivalent.

Cost Effectiveness: A change in coating limits is likely to have a very high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective.

Comments:	In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in surface coating unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would also affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.
Staff Contact:	Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#50)
FACTORY FINISHED WOOD

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency.

Control Measure Source: EPA's CTG document.

Rule Effectiveness: 99%
Control Efficiency: up to about 65% (currently 55.6%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Coatings and solvents used in surface coating of factory finished wood
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 1.27 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to factory finished wood (flat wood paneling). Coating manufacturers would also be affected by the rule because they would have to produce compliant coatings for sale to the affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per HVLP spray gun or equivalent.

Cost Effectiveness: A change in coating limits is likely to have a very high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective.

Comments: In order of decreasing emission rates, VOCs emitted from typical factory finished wood surface coating processes consist of toluene (26.5%); xylene (15.0%); ethanol (10.2%); butanol (10.2%); MIBK (7.3%); IPA (5.7%); MEK (5.6%); butyl acetates (5.3%); aromatics other than xylene & toluene (3.4%); miscellaneous aliphatic VOCs (3.2%); ethyl acetate (2.9%); glycol ethers (1.7%); miscellaneous VOCs (3.0%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.

Staff Contact: Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#51)
SHEET, STRIP, AND COIL SURFACE COATING

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline (CTG) document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency.

Control Measure Source: EPA's CTG.

Rule Effectiveness: 99%
Control Efficiency: up to about 65% (currently 55.9%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Coatings and solvents used in sheet, strip, and coil surface coating
Identified SCCs: N/A
Total Affected Emissions (adjusted 1999 EI): 6.09 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to metal sheets, strips, and coils. Coating manufacturers would also be affected because they would have to produce compliant coatings for sale to the affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per HVLP spray gun or equivalent.

Cost Effectiveness: A change in coating limits is likely to have a very high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective.

Comments: In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in surface coating unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.

Staff Contact: Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#52)
CONSUMER PRODUCTS

Control Measure Description: A consumer products rule was adopted by the TNRCC (effective 5/27/94) as a part of the Rate of Progress State Implementation Plan. VOC content standards for 26 different consumer products were established totaling an estimated 11.3% reduction. Further emission reductions of consumer products could be achieved by placing stricter standards on existing products and by adopting additional regulations of product categories not currently regulated. A recent EPA survey identifies over 200 different types of consumer products, leaving over 170 for potential control. California Air Resources Board (CARB) estimates that VOC emissions from consumer products accounted for 15% of California's non vehicular emissions in 1990.

Control Measure Source: Title 17, California Code of Regulations, Division, Chapter 1, Subchapter 8.5, Article 2, Consumer Products, Sections 94507-94517.

Rule Effectiveness: 99%
Control Efficiency: 30%-80% (based on CARB estimates)
Rule Penetration: 100%

Source of Projected Emissions: The evaporation of solvents, propellants, and other organic ingredients emitted from the usage of consumer products.
Identified SCCs: n/a
Total Affected Emissions (adjusted 1999 EI): Houston/Galveston: 24.34 Tons per Ozone Day
Beaumont/Port Arthur: 2.35 Tons per Ozone Day

Affected Parties: Industrial manufacturers of consumer products

Estimated Costs: STAPPA/ALAPCO (Source Category Summery Paper, draft 7/9/93) reports that the total annual cost to the entire consumer products industry is estimated to range from 11 to 360 million dollars. The estimated annual costs for reformulating a single product to meet CARB's regulations ranges from \$16,000 to \$400,000 per product. Assumptions were made that manufacturers would reformulate to a similar complying product form with no additional capital or raw material costs and that products would be marketed nationally.

Cost Effectiveness: Cost effectiveness ranges from a net savings of \$100 per ton of VOC removed to \$3400 per ton of VOC removed according to the San Diego AQMD (STAPPA/ALAPCO, 7/9/93).

Comments: Reactivity and toxicity vary among the different product categories. There is no effect on NO_x emissions as a result of VOC reductions in consumer products. Emission estimates were based on EPA's EI guidelines while emission reductions were based on CARB's estimated percentage reductions applied to Texas' total emissions. Assumptions were made that 100% of VOCs evaporate into the atmosphere and that consumers in Texas behave the same as consumers in California. Further work is needed in identifying emissions from specific consumer product subcategories in order to adequately address potential future reductions.

Total emissions affected does not include Hairsprays or Automotive Windshield Washer Fluid since these two categories are being evaluated separately.

Staff Contact: Brian Foster (512) 239-1930

EMISSION CONTROL MEASURES (#53)
CONSUMER PRODUCTS - HAIRSPRAYS

Control Measure Description: A consumer products rule was adopted by the TNRCC (effective 5/27/94) as a part of the Rate of Progress State Implementation Plan. VOC content standards were established for 26 different consumer products, including hairsprays (80% by weight). In a 1990 consumer products survey, California Air Resources Board (CARB) estimated that hairsprays emitted more VOCs than any other consumer product category, accounting for approximately 46% of the 16 products being proposed for regulation. In order to further reduce VOC emissions from hairsprays, the existing Texas rule would have to be revised. California has adopted a future standard of 55% VOC effective January 1, 1998. It is reported that the technology is being developed to comply with this future limit specifically by the reformulation of the resin component and by the use of innovative technologies.

Control Measure Source: Title 17, California Code of Regulations, Division, Chapter 1, Subchapter 8.5, Article 2, Consumer Products, Sections 94507-94517.

Rule Effectiveness: 99%
Control Efficiency: 26%
Rule Penetration: 100%

Source of Projected Emissions: The evaporation of solvents, propellants, and other organic ingredients emitted from the usage of hairsprays.
Identified SCCs: n/a
Total Affected Emissions (adjusted 1999 EI): Houston/Galveston: 6.36 Tons per Ozone Day
Beaumont/Port Arthur: 0.62 Tons per Ozone Day

Affected Parties: Industrial manufacturers of consumer products

Estimated Costs: Individual analysis for each consumer product category is not readily available due to the complexity of the market.

Cost Effectiveness: The cost effectiveness for consumer product regulation in general ranges from a net savings of $100 per ton of VOC removed to $3400 per ton of VOC removed (STAPPA/ALAPCO draft 07/09/93).

Comments: Reactivity of hairsprays is as follows: Ethanol (Maximum Incremental Reactivity) 1.34, (Reactivity Points) 2; Butane 1.02, 1; Propane 0.48, 1. Dimethyl phthalate, a plasticizer used to modify hardness, is classified as a hazardous air pollutant. There is no effect on NO_x emissions as a result of VOC reductions in consumer products. Emission estimates for hairspray usage in Texas were based on California's emission data (CARB Staff Report, August 1990) applied to Texas' population. Assumptions were made that 100% of VOCs evaporate into the atmosphere and that consumers in Texas behave the same as consumers in California. Further work is needed in identifying emissions from specific consumer product subcategories in order to adequately address potential future reductions.

Staff Contact: Brian Foster (512) 239-1930

EMISSION CONTROL MEASURES (#54)
CONSUMER PRODUCTS - AUTOMOTIVE WINDSHIELD WASHER FLUID

Control Measure Description:	A consumer products rule was adopted by the TNRCC (effective 5/27/94) as a part of the Rate of Progress State Implementation Plan. VOC content standards were established for 26 different consumer products, including automotive windshield washer fluid (23.5% by weight). In a 1990 consumer products survey, California Air Resources Board (CARB) estimated that automotive windshield washer fluids were the second largest emitting product category, accounting for approximately 24% of the 16 products being proposed for regulation. In order to further reduce VOC emissions from automotive windshield washer fluid, the existing Texas rule would have to be revised. Because of the need for adequate freeze protection during the winter months, reduction of VOCs from automotive washer fluid would be limited to the Gulf Coast area of Texas until an acceptable non VOC washer fluid is developed.
Control Measure Source:	Title 17, California Code of Regulations, Division, Chapter 1, Subchapter 8.5, Article 2, Consumer Products, Sections 94507-94517.
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	99% 66% 100%
Source of Projected Emissions:	The evaporation of solvents from the usage of automobile windshield washer fluid.
Identified SCCs:	n/a
Total Affected Emissions (adjusted 1999 EI):	Houston/Galveston: 3.07 Tons per Ozone Day Beaumont/Port Arthur: 0.30 Tons per Ozone Day
Affected Parties:	Industrial manufacturers of automotive windshield washer fluid.
Estimated Costs:	Individual analysis for each consumer product category is not readily available due to the complexity of the market.
Cost Effectiveness:	The cost effectiveness for consumer product regulation in general ranges from a net savings of $100 per ton of VOC removed (associated with the dilution of windshield washer fluid) to $3400 per ton of VOC removed (STAPPA/ALAPCO draft 07/09/93).
Comments:	Reactivity of automotive windshield washer fluid compounds is as follows: Methanol - Maximum Incremental Reactivity (MIR) 0.56, Reactivity Points 1; Isopropanol - MIR 0.54, Reactivity Points 1. Methanol is classified as a hazardous air pollutant. There is no effect on NO_x emissions as a result of VOC reductions in consumer products. Emission estimates for windshield washer fluid were based on EPA's emission factor of 0.6 pounds/capita/year and assumes that all VOCs evaporate into the atmosphere (Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol.1, EPA, May 1991). While EPA's emission factor specifically identifies windshield washer fluid, other subcategories are very broad. Further work is needed in identifying emissions from specific consumer product subcategories in order to adequately address potential future reductions.
Staff Contact:	Brian Foster (512) 239-1930

EMISSION CONTROL MEASURE (#55)
(AGRICULTURAL PESTICIDE APPLICATION)

Control Measure Description:	VOC emissions from the application of agricultural pesticides could be reduced through a variety of measures, which might include; restricting the use of high VOC emitting pesticides in certain areas during certain seasons (depending on the availability of alternative products), use of low VOC content products, use of improved efficiency application equipment (eg. ultra-low volume sprayers, electrostatic applicators), drift reduction training for applicators, encouraging manufacturers to reformulate their products without volatile organic solvent when practical, and the promotion of Integrated Pest Management techniques. These measures could be voluntary or enforceable.
Control Measure Source:	Control of VOC Emissions From the Application of Agricultural Pesticides, EPA Alternative Control Technology Document, EPA-453/R-92-011, March 1993
Rule Effectiveness:	NA
Control Efficiency:	
Rule Penetration:	NA
Source of Projected Emissions:	Agricultural pesticide application
Identified SCCs:	NA
Total Affected Emissions (adjusted 1999 EI):	Some fraction of the 3.48 and 0.50 Tons per Ozone Day reported, respectively, in the H/Ga and B/PA control measure catalogs.
Affected Parties:	Users, manufacturers, and distributors of agricultural pesticides.

Estimated Costs:	Use of low VOC content products, when effective substitutes are available, should not result in additional costs. Costs for alternative application methods are unknown but would include the cost of equipment, applicator training, equipment maintenance and calibration. Reformulation will only be practical for certain pesticides. Costs to manufacturers that reformulate will include expenses related to any EPA required studies for reregistration, and to changes in manufacturing and packaging. Many manufacturers are already reformulating organic solvent based pesticides (under pressure from other states to minimize VOC emissions, from DOT which is placing restrictions on the transport of flammable chemicals, and amidst concerns about applicator and worker chemical exposure). Integrated Pest Management costs will vary depending on individual circumstances, but studies have shown IPM can be a profitable practice as overall pesticide usage is reduced.

Cost Effectiveness: unknown

Comments: The state of California has tracked pesticide use, by chemical and by area, since 1990. Both "general" and "restricted" use pesticides are tracked since both types are used by agricultural applicators and both can contain VOCs. The state has also required pesticide manufacturers to determine the VOC content of these products. From this detailed use reporting and VOC content information, the state will develop a 1990 baseline inventory of estimated pesticide emissions.

EPA, in the California FIP, proposed a plan to use this inventory to rank the pesticides on the list according to VOC content. The ranking would continue until the sum of the % VOC content of those ranked totaled to 40-70% of the total base year emissions. The VOC content of the last pesticide to be ranked would represent the "new VOC limit". Use of those pesticides with VOC content above the new limit would be restricted. EPA estimates this plan would reduce VOC emissions from pesticides by 20-45%.

The state, in response to EPA, has proposed an alternate, more flexible plan. The 1990 baseline inventory will be used to first educate users and promote voluntary changes in pest management practices (eg. substitution of low VOC products, adoption of new application techniques, promotion of IPM, etc.) Only after these approaches have been given a chance to work will regulatory approaches, such as placing restrictions on the sale and distribution of high VOC content products, be considered. The state goal is to achieve a 20% pesticide VOC emission reduction by the year 2005.

TNRCC does not currently regulate the use of agricultural pesticides. The Texas Dept. of Agriculture registers "restricted" use pesticides for use in the state and oversees certification and training of applicators. Licensed applicators must maintain a "Pesticide Application Record" in which the amount and type of restricted use pesticide that is applied, the location, time of day, wind conditions, etc. are recorded. This information, however, which the licensed applicator must keep for two years, is not collected or tracked by the TDA. Furthermore, use of "general" use pesticides is not recorded at all. Consequently, it would be difficult to obtain an accurate pesticide emission inventory for Texas.

A coordinated effort by TNRCC/TDA to gather this type of data for the H/Ga and B/PA nonattainment areas is needed in order to target our emission reduction strategies to those chemicals/areas that will result in the greatest improvement. The Agricultural Extension Service, in 1990 and 1993, surveyed its extension agents to compile pesticide use data for all Texas counties. The 1990 survey results are available.

Example VOCs include xylene and toluene. Since VOC composition will vary among pesticides, determination of specific VOCs is not possible without obtaining use data for those areas of interest.

Staff Contact: Ann Brotherman (512) 239-6255

EMISSION CONTROL MEASURE (#56)
(NAPHTHA DRY CLEANERS)

Control Measure Description:	The proposed measure lowers the exemption level based on Naphtha consumption from 3,500 gallons per year to 2,000 gallons per year.
Control Measure Source:	CTG, NSPS Subpart JJJ, SCAQMD and Bay Area rules.
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	99% 80% 90%
Source of Projected Emissions: **Identified SCCs:** **Total Affected Emissions (Adjusted 1999 EI):**	Petroleum dry cleaning facilities. N/A
Affected Parties:	Owners or operators of petroleum dry cleaning facilities in the H/G and B/PA areas. It is expected that over 40% of the approximately 200 petroleum dry cleaning facilities in the H/G will be subject to the rule.
Estimated Costs: **Cost Effectiveness:**	Cost required to implement the proposed control measure ranges between $25,000 to $35,000. Significant savings, however, are expected to result from the installation of the control equipment. The operating cost of the facility would significantly be reduced due to the recovery dryer's lower demand for steam and electricity and the savings that will result from the recovered solvent. It is estimated that a small size facility would be able to pay back the capital cost of its control equipment in seven years using the generated savings only. The cost effectiveness is estimated at $300 saved per ton of emissions reduced.
Comments:	Naphtha solvents are a mixture of mainly C_8 to C_{12} hydrocarbons that are similar to Kerosene. These hydrocarbons can be further subdivided into three molecular structures: aliphatics, alicyclics, and aromatics.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#57)
(MUNICIPAL SOLID WASTE LANDFILLS)

Control Measure Description: The proposed measure lowers the exemption level based on annual emissions of non-methane organic compounds (NMOC) from 150 Mg per year to 50 Mg per year.

Rule Source: Proposed NSPS subpart WWW, SCAQMD FIP.

Rule Effectiveness: 99%
Control Efficiency: 70%
Rule Penetration: 95%

Source of Projected Emissions: Municipal Solid Waste Landfills.
Identified SCCs: N/A
Total Affected Emissions (Adjusted 1999 EI):

Affected Parties: Municipalities and commercial Operators of municipal solid waste landfills. It is expected that over 50% of the 74 landfills in the Houston/Galveston area and the 6 landfills in the Beaumont/Port Arthur will be subject to the rule.

Estimated Costs: The capital cost to install a gas collection and treatment system and a control device can be as high as 3 million dollars.

Cost Effectiveness: A base figure of $1,000 per ton of NMOC reduced, is used as an average cost of controls for new and existing MSWLF. In a study sponsored by EPA titled, "Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines", and in the preamble of the proposed NSPS, cost estimates ranging from $500 per ton to $2,800 per ton of NMOC reduced were reported. These cost figures do not take into account the profits that can be generated from energy recovery or sales of natural gas. ECOGAS Incorporation provided TNRCC with cost data for an average size landfill. The data show a total capital cost of $3 million. The amount of liquid natural gas sales that can be generated from this size landfill is about $600,000 annually. The data presented suggested a pay back period of 5 years.

Comments: Typical NMOC generated from landfills are Ethane, Toluene, Methylene Chloride, Hydrogen Sulfide, EthylBenzene, Xylene, 1,2 - Dimethyl Benzene, Limonene.

Staff Contact: Gus Eghneim (512) 239-1965

Point Sources

EMISSION CONTROL MEASURE (#58)
GENERAL SURFACE COATING APPLICATION

Control Measure Description:	Emissions reported under this category will most likely be from one of the following: miscellaneous metal parts/products coatings (current rule already in effect), architectural & industrial maintenance (AIM) coatings (EPA national rule being developed), wood parts/products coatings (current rule in Houston/Galveston), or plastic parts coatings (no rule in place, but EPA has issued an ACT guidance document). Additional investigation is being pursued to determine how much of the category is already controlled.
Control Measure Source:	
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	
Source of Projected Emissions: **Identified SCCs:** **Total Affected Emissions (adjusted 1999 EI):**	
Affected Parties:	
Estimated Costs: **Cost Effectiveness:**	
Comments:	
Staff Contact: Eddie Mack (239-1488)	

EMISSION CONTROL MEASURE (#59)
METAL CAN SURFACE COATING

Control Measure Description: The TNRCC has an existing rule which was based upon an EPA Control Techniques Guideline (CTG) document. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include more stringent coating limits than those in the current rule. The use of enclosed gun cleaners and/or high-transfer efficiency application equipment could also be required in order to increase the control efficiency.

Control Measure Source: EPA's CTG document.

Rule Effectiveness: 99%
Control Efficiency: up to about 65% (currently 55.2%)
Rule Penetration: 75% (currently 75%)

Source of Projected Emissions: Coatings and solvents used in surface coating of metal cans.
Identified SCCs: 4-02-017-xx
Total Affected Emissions (adjusted 1999 EI): 3.0 Tons per Ozone Day

Affected Parties: This rule would target companies which apply coatings to metal cans. Coating manufacturers would also be affected by the rule because they would have to produce compliant coatings for sale to the affected companies.

Estimated Costs: In some cases, compliant coatings may be readily available. In other cases, the coating manufacturers would have to reformulate their coatings to meet the rule (although the reformulated coatings may not achieve the same quality of finish as current coatings). The actual cost of this research & development is impossible to accurately quantify. Manufacturers who must reformulate their coatings will pass the cost on to the affected companies, who in turn will pass the coating costs on to consumers. Known costs are: approximately $120 per month for a spray gun cleaner; and $500-1000 per high-volume low-pressure (HVLP) spray gun or equivalent.

Cost Effectiveness: A change in coating limits is likely to have a very high cost per ton of VOC reduced since many companies would be unable to find acceptable compliant coatings and therefore would be forced to install expensive add-on control equipment. There are likely to be technical problems with changing coating application equipment; however, enclosed gun gleaners are expected to be relatively cost-effective.

Comments: In order of decreasing emission rates, VOCs emitted from typical surface coating processes consist of miscellaneous aliphatic VOCs [mineral spirits & naphthas] (20.4%); toluene (11.2%); MEK (8.6%); acetone (8.1%); xylene (8.0%); ethylene glycol monobutyl ether (7.0%); other glycol ethers (8.6%); propanol (6.1%); ethanol (5.5%); butyl acetate (2.8%); butanol (2.6%); ethyl acetate (2.3%); methanol (2.3%); MIBK (2.3%). Several of these (toluene, xylene, MEK, MIBK) are classified as air toxics under Title III. There is no effect on NOx emissions as a result of VOC reductions in surface coating unless an affected facility elects to install a combustion-type control device in lieu of using compliant coatings. Since this rule would also affect area sources, the coating limits would need to be set at an achievable level so that add-on controls would not be necessary.

Staff Contact: Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#60)
SURFACE COATING - COATING OVENS

Control Measure Description:	Emissions reported under this category will most likely be from one of the following: surface coating of miscellaneous metal parts/products, fabric, paper, large appliances, cans, coils, flatwood products, and metal furniture (current rules already in effect); surface coating of wood parts/products (current rules in Houston/Galveston; MACT standards forthcoming); or surface coating of plastic parts (no rules in place, but EPA has issued an ACT guidance document). Additional investigation is being pursued to determine how much of the category is already controlled. Rules would not be developed which target coating ovens; rather, appropriate credit would be taken for any emission reductions associated with any rule changes to the various surface coating rules.
Control Measure Source:	
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	
Source of Projected Emissions: **Identified SCCs:** **Total Affected Emissions (adjusted 1999 EI):**	
Affected Parties:	
Estimated Costs: **Cost Effectiveness:**	
Comments:	
Staff Contact:	Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#61)
CHEMICAL MANUFACTURING - LOADING RACKS; TRANSPORTATION & MARKETING - TANK TRUCKS/CARS LOADING; PETROLEUM STORAGE TANK - LOADING RACKS

Control Measure Description: The TNRCC has existing rules for land-based VOC loading operations (§§115.211-115.219). In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include a 95% control efficiency rather than the 90% control level of the current rule.

Control Measure Source: Negotiations for TNRCC's current rule.

Rule Effectiveness: 99%
Control Efficiency: 95% (currently 90%)
Rule Penetration: N/A

Source of Projected Emissions: VOC loading racks
Identified SCCs: 4-06-001-xx (transportation & marketing - tank trucks/cars loading); 4-08-999-95 and 4-08-999-99 (chemical manufacturing - loading racks); 4-04-002-50 (petroleum storage tank - loading racks)
Total Affected Emissions (adjusted 1999 EI): 2.00 TPOD (transportation & marketing - tank trucks/cars loading)
+ 15.84 TPOD (chemical manufacturing - loading racks)
+ 1.85 TPOD (petroleum storage tank - loading racks)
= 19.69 TPOD

Affected Parties: This rule would target land-based facilities which load VOCs into transport vessels (tank trucks, railcars) in HGA and/or BPA.

Estimated Costs: Industry has vehemently protested any raising of the control efficiency as not being cost-effective.

Cost Effectiveness:

Comments: Many VOCs loaded appear on the list of HAPs, including benzene, toluene, hexane, ethylbenzene, naphthalene, cumene, xylenes, n-hexane, 2,2,4-trimethylpentane, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), and methyl tert-butyl ether (MTBE). In many cases, affected facilities have installed combustion-type VOC control devices, resulting in NOx emission increases.

Staff Contact: Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#62)
MARINE VESSEL LOADING (POINT & AREA SOURCES)

Control Measure Description: The TNRCC has an existing rule for Houston/Galveston (HGA) which was developed by the marine vessel loading workgroup in 1993-1994. In order to take credit for additional emission reductions, the TNRCC could revise its existing rule to include a 95% control efficiency rather than the 90% control level of the current rule. The rule could be extended to Beaumont/Port Arthur (BPA) at either the 90% or 95% control level. The exemption level could also be lowered from 100 to 25 TPY, but this will not generate additional creditable emission reductions since previous calculations already took this credit. Also, EPA has proposed an MACT standard for marine vessel loading of gasoline and crude oil which may provide reductions beyond those achieved by the TNRCC's current rule (reductions are undetermined at this time).

Control Measure Source: EPA's draft MACT standard; negotiations for TNRCC's current rule.

Rule Effectiveness: 99%
Control Efficiency: 95% (currently 90%)
Rule Penetration: 100%

Source of Projected Emissions: Marine vessel loading
Identified SCCs: 4-08-999-97 (marine vessels: loading rack)
Total Affected Emissions (adjusted 1999 EI): 3.79 (area) + 5.62 (point) = 9.41 TPOD

Affected Parties: This rule would target facilities which load VOCs into marine vessels in HGA and/or BPA.

Estimated Costs: According to industry representatives, the cost to equip a single marine terminal (in BPA) with controls may be as high as $8,000,000. Industry has vehemently protested any lowering of the exemption level or raising of the control efficiency as not being cost-effective.

Cost Effectiveness: For BPA, a cost-effective option is extension of the existing Reg. V rule to BPA. Taking credit for EPA's MACT (when actual reductions are known) is another option.

Comments: Many compounds found in gasoline vapor also appear on the list of HAPs, including benzene, toluene, hexane, ethylbenzene, naphthalene, cumene, xylenes, n-hexane, 2,2,4-trimethylpentane, and methyl tert-butyl ether (MTBE). Other HAPs are also emitted from marine vessel loading operations. In many cases, affected facilities will install combustion-type VOC control devices, resulting in NOx emission increases.

Staff Contact: Eddie Mack 239-1488

EMISSION CONTROL MEASURE (#63)
OIL & GAS PRODUCTION
(GLYCOL DEHYDRATORS)

Control Measure Description: The proposed measure will require natural gas glycol dehydrators used in natural gas/gasoline processing to control VOC emissions by installing a condenser and a separator (or flash tank), or equivalent control device to achieve a minimum control efficiency of 95% by weight. Natural gas glycol dehydration units used in natural gas production and natural gas pipeline transportation will be required to control VOCs depending on the level of controlled emissions of the entire site where the unit is located. For VOC emissions at or above 25 TPY and below 50 TPY, the required control efficiency will be 80% by weight. For VOC emissions at or above 50 TPY and below 75 TPY, the required control efficiency will be 85% by weight. For VOC emissions at or above 75 TPY, the required control efficiency will be 90% by weight.

Control Measure Source: TNRCC

Rule Effectiveness: 99%
Control Efficiency: 95% for processing, varies for transportation & production
Rule Penetration: N/A for point source, unknown for area source

Source of Projected Emissions: Natural gas glycol dehydration units.
Identified SCCs: 3-10-002-02
Total Affected Emissions (adjusted 1999 EI): Some fraction of the 9.15 point source and 5.12 area source Tons per Ozone Day reported in the H/Ga control measure catalog, and some fraction of the 0.46 point source 2.80 area source Tons per Ozone Day reported in the B/PA control measure catalog.

Affected Parties: All operators of natural gas glycol dehydration units in the H/Ga and B/PA areas at sites which emit 25 TPY or greater VOCs.

Estimated Costs: Economic costs are estimated to be $25,000 for control equipment and testing. A cost benefit of $5,000 per vapor recovery system is possible due to the installed control devices which could generate income and fuel savings from the recovered natural gas liquids and vapors from the natural gas glycol dehydration process.

Cost Effectiveness: Approximately $100/ton. Cost data provided by Texas Mid-Continental Oil & Gas Association

Comments: VOC emissions include benzene, toluene, ethylbenzene, and xylene. EPA is scheduled to propose by 6/95 and promulgate by 6/96 a MACT standard which targets glycol dehydrator reboiler vents.

Staff Contact: Ann Brotherman (512) 239-6255

EMISSION CONTROL MEASURE (#64)
(BREWERIES)

Control Measure Description: Breweries will implement practices to minimize spillage in filling operations, keg cleaning and waste beer processing. Wastewater streams and components shall be covered at all times and routed to a treatment system capable of a VOC reduction efficiency equivalent to that obtained from the use of properly operated biotreatment unit. Emissions from the fermentation tanks will be reduced by the use of a condensor. Coding of bottles, cans, cases, and kegs will incorporate the use of low VOC containing inks or an ink-free laser coding process.

Control Measure Source: for wastewater: extension of the applicability of the wastewater rule (§ 114.140-149) to breweries, for wastewater, fermentation and ink coding: a phone conversation with Bay Area Air Quality Management District, San Francisco, Calif., provided information on existing controls and processes at a San Francisco brewery owned by the same parent company as the Houston brewery. At this facility, ethanol emissions from wastewater and fermentation tanks are being controlled, and the ink coding process has been replaced by a laser coding system.

Rule Effectiveness: for wastewater: 99%, for fermentation tank vents: 99%
Control Efficiency for wastewater: 95%, for Fermentation tank vents: 85%
Rule Penetration: NA

Source of Projected Emissions: Emissions from beer spillage, wastewater streams, fermentation tanks and ink coding of bottles, cans, cases, and kegs.
Identified SCCs: 302-009-98, 03, 04
Total Emissions in Food & Agriculture (PT) in 1990 EI: 1.35 TPOD
Total Affected Emissions (Adjusted 1999 EI): some fraction of the approximately 0.2 Tons per Ozone Day emitted by this brewery.

Affected Parties: Operators of major source breweries in the H/GA area.

Estimated Costs: Unknown

Cost Effectiveness: Unknown

Comments:	VOC emissions from filling operations have only recently been studied, but estimates are that 20-40% of total brewery VOC emissions (ethanol) result from spillage. These emissions were not reported in the 1990 EI. VOCs from beer spillage, wastewater streams and fermentation tanks are predominately ethanol. VOCs from ink coding processes include methanol and methyl ethyl ketone. A search of the Houston point source inventory yielded five accounts under the category of "food and agriculture"; two snack chip manufacturers, a cookie and cracker manufacturer, a coffee roasting facility, and a brewery. Reported VOC emissions from both snack chip manufacturers are well below 1 TPY. VOC emissions from the cookie manufacturer were reported in 1990 at 212 TPY, due primarily to ethanol emissions from yeasted sponge dough. In May 1994, this facility installed a catalytic oxidizer which achieves 95% control of the sponge dough oven emissions. Total facility emissions are now expected to approximate 21 TPY of VOCs. The coffee roasting facility reported VOC emissions of 26 TPY in 1990 and approx. 13 TPY in 1992. The majority of these emissions come from two continuous roasting ovens, each equipped with a catalytic afterburner, which are described as having a VOC destruction efficiency of 80%.
Staff Contact:	Ann Brotherman (512)-239-6255

EMISSION CONTROL MEASURE (#65) (PULP & PAPER)

Control Measure Description: The proposed MACT standards would require the control of hazardous air pollutant (HAP) emissions. Whereas volatile organic compound (VOC) emissions are not specifically targeted by the MACT, the control technologies upon which the standards are based will similarly reduce VOC emissions. The MACT Phase 1 standards (the only ones that have been proposed to date), address pulping of wood chips, evaporation of weak spent cooking liquor, pulp bleaching and wastewater processes (excluding those related to pulp bleaching). Pulping operations will be required to reduce HAP emissions by at least 98% based upon the use of combustion. Bleaching operations will reduce HAP emissions by 99% based upon the use of a scrubber. Pulping process wastewater HAPs will be reduced by 90% based upon the use of steam stripping; the resulting wastewater HAP emissions are then routed to a control device achieving at least 98% reduction (based upon the use of combustion), for an overall control efficiency of 88%. All pulping and bleaching emissions subject to the standards must be captured and contained by enclosing all open processes and routing emissions through a closed vent system. The MACT also includes monitoring and recordkeeping requirements.

Control Measure Source: Proposed MACT standard

Rule Effectiveness: for pulping: 99%, for bleaching: 100%, for wastewater: 99%
Control Efficiency: for pulping: 99%, for bleaching: 99%, for wastewater: 87%.
Rule Penetration: NA

Source of Projected Emissions: Pulping and bleaching vents and pulping wastewater streams.
Identified SCCs: 307-001-01, 02, 03, and 07 (related to pulping). No specific SCC codes were located for bleaching or pulping wastewater. These type emissions probably reported under "fugitive" SCCs 3-07-888-01, 02, 03, 04, 05, and 98.
Total Emissions affected in 1990 EI: some fraction of the 6.59 and 1.76 Tons per Ozone Day listed in the control measure catalogs for H/GA and B/PA, respectively.

Affected Parties: Operators of mill processes in the H/GA and B/PA areas.

Estimated Costs: Costs vary depending on the size of the mill, the extent to which pulping processes are already enclosed, and control device selection. For pulping vents; total capital investment may range from $170,000 to $2,100,000, total annual costs may range from $58,000 to $450,000. For bleaching vents; total capital investment may range from $400,000 to $7,000,000, total annual costs may range from $160,000 to $7,500,000. For wastewater; total capital investment may range from $1,620,000 to $4,600,000; total annual costs may range from $840,000 to $4,600,000. (Cost data from Pulp & Paper MACT Background Information Document.)

Cost Effectiveness: Difficult to determine since cost estimates and specific mill reduction estimates range so widely. Industry estimates show a combined mill reduction of approx. 1100 tpy due to MACT 1 standards.

Comments:	The quantity and composition of emissions vary depending upon the type of processes and equipment used as well as on wood type (hardwood or softwood). VOCs include methanol, acetone, hexane, toluene, methyl ethyl ketone, and various terpenes. MACT Phase 1 standards are expected to be promulgated April 1996 (although there is some speculation that this date may slide to Fall 1997. Mills then have 3-4 years to comply. MACT 2, which targets recovery furnaces and black liquor oxidation units, is expected to be proposed Oct.1995. MACT 3 (paper machines, and non-chemical pulping) and MACT 4 (boilers) are also being developed.
Staff Contact:	Ann Brotherman (512) 239-6255

EMISSION CONTROL MEASURE (#66)
(STATIONARY EXTERNAL COMBUSTION)

Control Measure Description: Optimized combustion practices

Control Measure Source: Vendor information

Rule Effectiveness: N/A
Control Efficiency:
Rule Penetration: N/A

Source of Projected Emissions: Boilers, process heaters, incinerators, dryers, and kilns
Identified SCCs: 1-01-001-01 through 1-05-002-14
Total Affected Emissions (adjusted 1999 EI): 14.29 tons per ozone day

Affected Parties: Operators of boilers, process heaters, incinerators, dryers, and kilns

Estimated Costs: \$10,000-20,000 capital cost per unit for CO/O_2 trim (already required for certain units under NO_x RACT rule) \$50,000 capital cost, \$10,000 annual cost per unit for continuous VOC monitoring

Cost Effectiveness: N/A

Comments: External combustion sources are typically fired with natural gas or fuel oil. VOC emissions are produced from unburned organics present in the fuel, and result from poor combustion conditions such as inefficient fuel-air mixing, low temperatures, and short residence time. Since these same conditions cause CO emissions to increase, continuous monitoring of CO may be used as a surrogate for VOC emissions. CO CEMS is already required for large boilers and process heaters under the NO_x RACT rule. Combustion modifications for NO_x control can result in CO and VOC increases.

Devices such as O_2 analyzers and CO or O_2 trim, which optimize fuel combustion efficiency, are readily available. However, these systems cannot be considered as VOC controls, since they give only a qualitative indication of VOCs produced during combustion.

It is important to note that VOCs emitted from natural gas-fired external combustion units consist mainly of nonreactive methane and ethane. VOCs reported in the 1990 EI have not consistently reflected this distinction. Taking this into account will greatly affect baseline emissions and cost-effectiveness figures.

Staff Contact: Mike Magee 239-1511

EMISSION CONTROL MEASURE (#67)
MISCELLANEOUS MANUFACTURING INDUSTRIES

Control Measure Description: Additional storage tank controls

Control Measure Source: N/A

Rule Effectiveness: N/A
Control Efficiency:
Rule Penetration: N/A

Source of Projected Emissions: Storage tanks in miscellaneous service
Identified SCCs: 3-99-999-93 through 3-99-999-98
Total Affected Emissions (adjusted 1999 EI): 10.16 tons per ozone day

Affected Parties: Miscellaneous chemical manufacturing

Estimated Costs: N/A
Cost Effectiveness: N/A

Comments: A single emission point at a source in the 1990 EI accounted for 9.19 tons per ozone day (90% of the VOC emissions for this category). Using 90% RE in projecting the emissions to 1999 resulted in a nine-fold increase in VOCs from the 1990 base year. Zero emissions have been reported for this emission point since 1992, when it was controlled by incineration. The remaining VOCs in this category (0.97 tons per ozone day) are essentially storage tank emissions. An evaluation of the creditability of the reduction is being conducted. Feasibility of additional controls has not yet been researched.

Staff Contact: Mike Magee 239-1511

EMISSION CONTROL MEASURE (#68)
PRIMARY METAL PRODUCTION

Control Measure Description: N/A

Control Measure Source: N/A

Rule Effectiveness: N/A
Control Efficiency: N/A
Rule Penetration: N/A

Source of Projected Emissions: Primary Metal Production
Identified SCCs: 3-03-001-01 through 3-03-900-14
Total Affected Emissions (adjusted 1999 EI): 1.68 tons per ozone day

Affected Parties: Primary metal industries, chiefly foundries which produce castings and miscellaneous metal parts.

Estimated Costs: N/A
Cost Effectiveness: N/A

Comments: This category has been removed from present consideration in the control measure catalog. A source entered the contaminant code for "nitrofene," a VOC, instead of the code for "nitrogen" in its 1990 EI, resulting in VOC emissions for this category being overreported by a factor of ten. After the EI staff corrected this error in the 1993 EI, the total VOC emissions for this category are now 0.17 tons per ozone day.

Staff Contact: Mike Magee 239-1511

EMISSION CONTROL MEASURE (#69)
(CHEMICAL MANUFACTURING - FUGITIVE LEAKS)

Control Measure Description: The proposed measure implements the MACT standards for fugitive emissions in the chemical manufacturing industry. The leak definitions for pumps and compressors are reduced from 10,000 ppm to 2,000 ppm. The standards also require monthly inspection of all accessible components.

Control Measure Source: CTG, SOCMI HON, NSPS subpart VV

Rule Effectiveness: 99%
Control Efficiency 95%-96%
Rule Penetration: N/A

Source of Projected Emissions: Chemical Manufacturing Industry.
Identified SCCs: 301-001-80, 301-005-09, 301-031-80, 301-034-06, 14, 301-091-80, 301-100-80, 301-120-07, 17, 37, 301-124-80, 301-125-09, 14, 24, 29, 34, 50, 55, 301-127-80, 301-132-27, 301-133-80, 301-153-80, 301-156-80, 301-157-80, 301-158-80, 301-167-80, 301-169-80, 301-174-80, 301-176-80, 301-181-80, 301-190-80, 301-195-80, 301-197-09, 301-197-49, 301-202-80, 301-205-80, 301-206-80, 301-210-80, 301-211-80, 301-250-04, 301-251-80, 301-253-80, 301-254-09, 301-254-20, 301-301-80, 301-302-80, 301-303-80, 301-304-80, 301-305-80, 301-800-01, 301-888-01, 02, 03, 04, and 05.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of chemical manufacturing processes in the B/PA and H/G areas.

Estimated Costs: This rule implements the MACT standards for fugitive emissions at chemical manufacturing operations. There is no incremental capital or operating cost associated with this rule.
Cost Effectiveness: Economic impact analysis presented in the HON shows cost effectiveness values that indicate overall cost savings. These cost savings are generated by reducing the loss of valuable products in the form of emissions.

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#70)
(CHEMICAL MANUFACTURING - COOLING TOWERS)

Control Measure Description:	The proposed measure establishes a one part per million by weight (ppmv) VOC concentration rise as a leak definition for cooling tower systems. The measure further requires monthly inspection of the cooling water to detect VOC leaks and allows a maximum of 45 days for any leak to be repaired after it is detected. The proposed measure implements the MACT standards for cooling towers at SOCMI operations.
Control Measure Source:	TNRCC NSR, HON, "A Device for Measuring Volatile Organic-Carbon Emissions from Cooling-Tower Water", by W. D. Vernon et. al. of the El Paso Product Company R&D.
Rule Effectiveness: **Control Efficiency:** **Rule Penetration:**	99% 90% N/A
Source of Projected Emissions: **Identified SCCs:** **Total Affected Emissions (adjusted 1999 EI):**	Cooling Towers in the chemical manufacturing industry. 301-176-18, 385-001-02.
Affected Parties:	Operators of cooling tower systems in the B/PA and H/GA areas.
Estimated Costs: **Cost Effectiveness:**	There is no capital cost associated with this rule. The cost is limited to on-going maintenance and leak repair activities. The cost effectiveness of the proposed control measure is estimated to range between $500 to $2,000 per ton of VOC reduced. Savings may result from the implementation of this rule. These cost savings are generated by reducing the loss of valuable products in the form of emissions.
Comments:	The SOCMI HON includes control requirements for cooling towers under SOCMI processes. Reactivity and toxicity of VOC emitted from cooling tower systems vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to cooling tower emissions.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#71)
(CHEMICAL MANUFACTURING - INDUSTRIAL WASTEWATER)

Control Measure Description:	The proposed measure expands on the current TNRCC rule by implementing more of the HON standards for process wastewater in the SOCMI chemical manufacturing industry and extends its applicability to more non-SOCMI chemical manufacturing processes. The measure establishes a 95% removal efficiency for biotreatment units and a 99% removal efficiency for strippers. The rule also requires that all wastewater components be covered with either floating roofs or fixed roofs. The fixed roofs shall only be used in conjunction with a control device capable of achieving 98% control efficiency.
Control Measure Source:	SOCMI HON
Rule Effectiveness:	99%
Control Efficiency:	95%
Rule Penetration:	N/A
Source of Projected Emissions:	Chemical Manufacturing Industry.
Identified SCCs:	301-820-01 to 11.
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Operators of chemical manufacturing processes in the B/PA and H/G areas.
Estimated Costs:	This rule implements the MACT standards for process wastewater at chemical manufacturing operations.
Cost Effectiveness:	Economic impact analysis presented in the HON shows cost effectiveness values ranging from $430 per ton to $1,600 per ton of VOC removed.
Comments:	Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#72)
(FLARES)

Control Measure Description: The proposed measure requires all industrial flares to operate in accordance with 40 CFR 60.18(c) through (f). All industrial flares shall achieve 98% control efficiency. When a flare gas contains 80% (or more) of propylene and/or ethylene, a control efficiency of 99% shall be achieved.

Control Measure Source: 40 CFR 60.18

Rule Effectiveness: 99%
Control Efficiency: 98-99%
Rule Penetration: N/A

Source of Projected Emissions: Flares under any emission category regulated or expected to be regulated by Chapter 115.
Identified SCCs: 201-900-99, 301-900-99, 303-900-21, 22, 23, and 24, 304-900-21, 22, 23, and 24, 305-900-23, 306-009-03, 04, and 05, 307-900-21, 22, and 23, 308-900-23, 309-900-23, 310-002-05, 399-900-21, 22, 23, and 24, 402-900-23, 490-900-21, 22, and 23.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of industrial flares in the B/PA and H/GA areas.

Estimated Costs: Compliance with 40 CFR 60.18 requires that the flare gas flowrate and heating value be continuously monitored. The cost associated with this proposal would include the cost of purchasing and installing a GC analyzer or calorimeter, or performing frequent EPA reference test method 18, and installing a flow meter. The cost varies depending on the size of the flare and the frequency of stream switching. The capital cost could range between $0 to $100,000 and the operating cost could range between $10,000 to $100,000 per year.

Cost Effectiveness:

Comments:	The SCC codes listed above cover the following industries: Stationary Internal Combustion, Chemical Manufacturing, Metal Production, Mineral Products, Petroleum Industry, Pulp & Paper and Wood Products, Rubber & Plastic Products, Fabricated Metal Products, Oil and Gas Production, Misc. Manufacturing Industries, Surface Coating Operations, and Organic Solvent Evaporation. Reactivity and toxicity of VOC emitted from industrial flares vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to flares emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#73)
(INCINERATORS)

Control Measure Description: The proposed measure requires emission testing to establish demonstrated compliance parameter levels (such as inlet and exhaust temperatures, flowrates, etc..) for thermal and catalytic incinerators. These levels shall be established to insure 99% destruction efficiency for thermal incinerators and 95% destruction efficiency for catalytic incinerators.

Control Measure Source: "Air Pollution Control, A Design Approach" by C. D. Cooper and F. C. Alley, ISBN 0-88133-521-5.

Rule Effectiveness: 99%
Control Efficiency for Thermal Incinerators: 99%
Control Efficiency for Catalytic Incinerators: 95%
Rule Penetration: N/A

Source of Projected Emissions: Incinerators under any emission category regulated or expected to be regulated by Chapter 115.
Identified SCCs: 301-900-11, 12, 13, and 14, 303-900-11, 12, 13, and 14, 304-900-11, 12, 13, and 14, 305-900-11, 12, and 13, 306-009-01, 02, 03, 04, and 05, 307-900-11, 12, and 13, 308-900-11, 12, and 13, 309-900-11, 12, and 13, 399-900-11, 12, 13, and 14, 402-900-11, 12, and 13, 490-900-11, 12, and 13, 501-001-01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, and 17, 502-001-01, 02, 03, 04, and 05, 502-005-05, and 06, 503-001-01, 02, 03, 04, 05, 06, 07, 08, 09, 503-002-01, 02, 03, 04, and 05, 503-005-01 and 06.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of industrial incinerators in the B/PA and H/GA areas.

Estimated Costs: Compliance with this rule does not require any capital expenditure. The operating cost include the cost of stack testing for the initial establishment and annual (or less frequent) verification of the demonstrated compliance parameter levels and additional quality assurance requirements. The operating cost varies depending on the size of the incinerator, the frequency of stream switching, and flowrate variability. The operating cost associated with this rule could range between $10,000 to $100,000 per year.

Cost Effectiveness:

Comments: The SCC codes listed above cover the following industries: Chemical Manufacturing, Metal Production, Mineral Products, Petroleum Industry, Pulp & Paper and Wood Products, Rubber & Plastic Products, Fabricated Metal Products, Misc. Manufacturing Industries, Surface Coating Operations, and Organic Solvent Evaporation, and Solid Waste Disposal.

Reactivity and toxicity of VOC emitted from industrial incinerators vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to incinerators emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#74)
(CHEMICAL MANUFACTURING - NON-SOCMI PROCESS VENTS)

Control Measure Description: The proposed measure raises the control efficiency for non-SOCMI processes from 90% to 98%

Control Measure Source: SOCMI HON, NSPS subpart NNN

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration: N/A

Source of Projected Emissions: Non-SOCMI process vents.
Identified SCCs: 301-005-06, 07, 08, and 09, 301-012-06, 301-023-21, 301-042-02 and 03, 303-001-07, 305-004-03.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of non-SOCMI chemical processes in the B/PA and H/GA areas. The SCC codes listed above cover the following industries: Carbon Black Production, Hydrofluoric and Sulfuric Acid Production, Lead Alkali Production, and metal production.

Estimated Costs: This rule extends the applicability of the MACT standards for process vents to include non-SOCMI chemical operations. The control efficiency is attainable by use of thermal incinerators and open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost of this rule proposal varies depending on the number of incinerators, flares, or other combustion devices that are currently present at each chemical plant and the availability to be used to attain such a control efficiency. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 while that of an open flare ranges between $50,000 to $500,000. The cost is very dependent on the design flowrate. The annual operating cost can be as high as $500,000 per year for incinerators and $300,000 per year for flares.

Cost Effectiveness:

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those non-SOCMI processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each non-SOCMI SCC code.

Staff Contact: Gus Egheim (512) 239-1965

EMISSION CONTROL MEASURE (#75)
(OIL & GAS PRODUCTION - FUGITIVE LEAKS)

Control Measure Description:	The proposed measure extends the applicability of the MACT standards for fugitive emissions to the oil & gas production facilities. The leak definitions for pumps and compressors are reduced from 10,000 ppm to 2,000 ppm. The standards also require monthly inspection of all accessible components.
Control Measure Source:	CTG, SOCMI HON, NSPS subpart KKK
Rule Effectiveness:	99%
Control Efficiency:	95%-96%
Rule Penetration:	N/A
Source of Projected Emissions:	The Oil & Gas Industry.
Identified SCCs:	310-002-07, 310-888-01, 02, 03, 04, 05.
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Operators of oil & gas production facilities in the B/PA and H/GA areas.
Estimated Costs:	This rule implements the MACT standards for fugitive emissions in the oil & gas production facilities.
Cost Effectiveness:	Economic impact analysis presented in the HON shows cost effectiveness values that indicate overall cost savings. These cost savings are generated by reducing the loss of valuable products in the form of emissions.
Comments:	Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#76)
(ORGANIC CHEMICAL STORAGE - FIXED ROOF)

Control Measure Description: The proposed measure lowers the true vapor pressure exemption level from 1.5 psia to 0.5 psia and adopts specifications and a repair schedule for fixed roof tank seals. The proposed measure also raises the control efficiency of the vapor recovery system from 90% to 95%.

Control Measure Source: SOCMI HON, NSPS subpart Ka and Kb, Draft CTG, Final ACT.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration: N/A

Source of Projected Emissions: Organic Chemical Storage.
Identified SCCs: 407-004-01, 97, 407-008-01 to 03, 05 to 18, 97, 98, 407-016-01, 03, 05 to 07, 09, 11 to 14, 97, 98, 407-020-01, 03, 05 to 07, 09, 11 to 14, 97, 98, 407-032-01 to 03, 05, 06, 97, 98, 407-036-01 to 07, 09 to 24, 97, 98, 407-040-01 to 05, 07 to 09, 97, 98, 407-044-01 to 09, 11, 13 to 24, 97, 98, 407-048-01, 02, 97, 98, 407-052-01, 03, 05, 07 to 11, 13, 15 to 17, 97, 98, 407-056-01 to 07, 09, 10, 97, 98, 407-060-01, 03 to 09, 11 to 15, 17 to 24, 97, 98, 407-064-01, 03, 97, 98, 407-068-01 to 04, 97, 98, 407-076-01, 02, 97, 98, 407-080-01, 97, 407-084-01, 04, 97, 98, 407-172-97, 98, 407-176-97, 98, 407-180-97, 98, 407-208-97, 98, 407-220-97, 98, 407-228-97, 98, 407-232-97, 407-816-99, 407-832-99, 407-848-01, 99, 407-860-03, 99, 407-864-99, 407-872-01, 99, 407-999-97, 99.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of chemical storage tanks in the B/PA and H/GA areas.

Estimated Costs: The 95% control efficiency is attainable by use of thermal or catalytic incinerators, carbon adsorption, and open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost varies depending on the number of incinerators, flares, or other control devices that are currently present at each plant and the availability to be used to attain such a control efficiency. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 while that of an open flare ranges between $50,000 to $500,000. The cost is very dependent on the design flowrate. The annual operating cost can be as high as $500,000 per year for incinerators and $300,000 per year for flares.

Cost Effectiveness: This rule adopts the NSPS subpart Ka requirements for fixed roof storage tanks. Cost estimates presented in the draft CTG for fixed roof tanks show a coat effectiveness of $1,800 per ton of VOC reduced for a 40,000 gallon tank at 0.5 psia true vapor pressure.

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#77)

(PETROLEUM INDUSTRY - PROCESS VENTS)

Control Measure Description: The proposed measure raises the control efficiency for catalytic cracking and distillation vents at petroleum refineries from 90% to 98%

Control Measure Source: SOCMI HON, NSPS subpart NNN, §115.121

Rule Effectiveness: 99%
Control Efficiency: 98% (
Rule Penetration: N/A

Source of Projected Emissions: catalytic cracking and distillation vents at petroleum refineries.
Identified SCCs: 306-002-01 and 02, 306-003-01, 306-004-01 and 02.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of petroleum refining processes in the B/PA and HGA areas.

Estimated Costs: This rule extends the applicability of the MACT standards for process vents at SOCMI operations to the refinery industry. The control efficiency is attainable by use of thermal incinerators and open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost of this proposal varies depending on the number of incinerators, flares, or other combustion devices that are currently present at each plant and the availability of these devices to be used to attain such a control efficiency. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 while that of an open flare ranges between $50,000 to $500,000. The cost is very dependent on the design flowrate. The annual operating can be as high as $500,000 per year for incinerators and $300,000 per year for flares.

Cost Effectiveness:

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected to those petroleum processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#78)
(PETROLEUM INDUSTRY - FUGITIVE LEAKS)

Control Measure Description:	The proposed measure extends the applicability of the MACT standards for fugitive emissions to the petroleum refining industry. The leak definitions for pumps and compressors are reduced from 10,000 ppm to 2,000 ppm. The standards also require monthly inspection of all accessible components.
Control Measure Source:	CTG, SOCMI HON, NSPS subpart GGG
Rule Effectiveness:	99%
Control Efficiency:	95%-96%
Rule Penetration:	N/A
Source of Projected Emissions:	Petroleum Refining Industry.
Identified SCCs:	306-008-01, 02, 03, 04, 05, 06, 07, 306-888-01, 02, 03, 04, 05.
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Operators of petroleum processes in the B/PA and H/GA areas.
Estimated Costs:	
Cost Effectiveness:	This rule implements the MACT standards for fugitive emissions in the petroleum refining industry. Economic impact analysis presented in the HON shows cost effectiveness values that indicate overall cost savings. These cost savings are generated by reducing the loss of valuable products in the form of emissions.
Comments:	Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#79)
(PETROLEUM STORAGE TANKS - FIXED ROOF)

Control Measure Description:	The proposed measure lowers the true vapor pressure exemption level from 1.5 psia to 0.5 psia and adopts specifications and a repair schedule for fixed roof tank seals. The proposed measure also raises the control efficiency of the vapor recovery system from 90% to 95%.
Control Measure Source:	SOCMI HON, NSPS subpart Ka and Kb, Draft CTG, Final ACT.
Rule Effectiveness:	99%
Control Efficiency:	95%
Rule Penetration:	N/A
Source of Projected Emissions:	Petroleum storage tanks.
Identified SCCs:	403-001-01 to 07, 403-001-50 to 54, 56, 57, 59, 61, 98,99, 403-010-01 to 21, 97 to 99, 404-001-01 to 09, 404-002-01 to 06, 404-003-01, 02.
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Operators of petroleum storage tanks in the B/PA and H/GA areas.
Estimated Costs:	The 95% control efficiency is attainable by use of thermal or catalytic incinerators, carbon adsorption, and open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost varies depending on the number of incinerators, flares, or other control devices that are currently present at each plant and the availability to be used to attain such a control efficiency. The total capital cost of a thermal incinerator ranges between \$100,000 to \$2,000,000 while that of an open flare ranges between \$50,000 to \$500,000. The cost is very dependent on the design flowrate. The annual operating cost can be as high as \$500,000 per year for incinerators and \$300,000 per year for flares.
Cost Effectiveness:	This rule adopts the NSPS subpart Ka requirements for fixed roof storage tanks. Cost estimates presented in the draft CTG for fixed roof tanks show a cost effectiveness of \$1,800 per ton of VOC reduced for a 40,000 gallon tank at 0.5 psia true vapor pressure.
Comments:	Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (80)
(PETROLEUM STORAGE TANKS - FLOATING ROOF)

Control Measure Description: The proposed rule lowers the true vapor pressure exemption level from 1.5 psia to 0.5 psia and adopts specifications and a repair schedule for floating roof tank seals. The proposed measure also raises the control efficiency of the vapor recovery system from 90% to 95%.

Control Measure Source: SOCMI HON, NSPS subpart Ka and Kb, Draft CTG, Final ACT.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration: N/A

Source of Projected Emissions: Petroleum storage tanks.
Identified SCCs: 403-002-01 to 04, 07 to 09, 12, 16, 99, 403-011-01 to 20, 30 to 35, 40 to 45, 50 to 55, 97 to 99, 404-001-10 to 17, 30, 31, 40, 41, 60, 61, 70, 71, 404-002-07 to 10, 30, 31, 40, 41, 60, 61, 70, 71, 404-003-04 and 05.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of petroleum storage tanks in the B/PA and H/GA areas.

Estimated Costs: The 95% control efficiency is attainable by use of thermal or catalytic incinerators, carbon adsorption, and open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost varies depending on the number of incinerators, flares, or other control devices that are currently present at each plant and the availability to be used to attain such a control efficiency. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 while that of an open flare ranges between $50,000 to $500,000. The cost is very dependent on the design flowrate. The annual operating cost can be as high as $500,000 per year for incinerators and $300,000 per year for flares.

Cost Effectiveness: This rule adopts the NSPS subpart Kb requirements for floating roof storage tanks. Cost estimates presented in the draft CTG for floating roof tanks show a cost effectiveness of $1,300 per ton of VOC reduced for a 40,000 gallon tank at 0.5 psia true vapor pressure.

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#81)
(PETROLEUM STORAGE TANKS - UNDERGROUND TANKS)

Control Measure Description: The proposed measure lowers the true vapor pressure exemption level from 1.5 psia to 0.5 psia and adopts specifications and a repair schedule for underground tank seals. The proposed measure also raises the control efficiency of the vapor recovery system from 90% to 95%.

Control Measure Source: SOCMI HON, NSPS subpart Ka and Kb, Draft CTG, Final ACT.

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration: N/A

Source of Projected Emissions: Underground storage tanks.
Identified SCCs: 404-004-02 to 04, 14, 97, 98.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of underground storage tanks in the B/PA and H/G areas.

Estimated Costs: The 95% control efficiency is attainable by use of thermal or catalytic incinerators, carbon adsorption, or open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost varies depending on the number of incinerators, flares, or other control devices that are currently present at each plant and the availability to be used in attaining such a control efficiency. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 while that of an open flare ranges between $50,000 to $500,000. The cost is very dependent on the design flowrate. The annual operating cost can be as high as $500,000 per year for incinerators and $300,000 per year for flares.

Cost Effectiveness: This rule adopts the NSPS subpart Kb requirements for storage tanks. Cost estimates presented in the draft CTG for storage tanks show a cost effectiveness of $1,400 to $1,800 per ton of VOC reduced for a 40,000 gallon tank at 0.5 psia true vapor pressure.

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#82)
(PETROLEUM INDUSTRY - COOLING TOWERS)

Control Measure Description: The proposed measure establishes a one part per million by weight (ppmv) VOC concentration rise as a leak definition for cooling tower systems. The measure further requires monthly inspection of the cooling water to detect VOC leaks and allows a maximum of 45 days for any leak to be repaired after it is detected.

Control Measure Source: TNRCC NSR, HON, "A Device for Measuring Volatile Organic-Carbon Emissions from Cooling-Tower Water", by W. D. Vernon et. al. of the El Paso Product Company R&D.

Rule Effectiveness: 99%
Control Efficiency: 90%
Rule Penetration: N/A

Source of Projected Emissions: Cooling Towers in the petroleum industry.
Identified SCCs: 306-007-01 and 02.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of cooling tower systems in the B/PA and H/GA areas. The SCC codes listed above are for the Petroleum Industry only.

Estimated Costs: There is no capital cost associated with this measure. The cost is limited to on-going maintenance and leak repair activities.

Cost Effectiveness: The cost effectiveness of the proposed control measure is estimated to range between $500 to $2,000 per ton of VOC reduced. Savings may result from the implementation of this rule. These cost savings are generated by reducing the loss of valuable products in the form of emissions.

Comments: The SOCMI HON includes control requirements for cooling towers in SOCMI processes.

Reactivity and toxicity of VOC emitted from cooling tower systems vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to cooling tower emissions.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#83)
(PETROLEUM INDUSTRY - INDUSTRIAL WASTEWATER)

Control Measure Description: The proposed measure extends the applicability of the SOCMI HON standards for process wastewater to the petroleum refining industry. The measure establishes a 95% removal efficiency for biotreatment units and a 99% removal efficiency for strippers. The measure also requires that all wastewater components be covered with either floating roofs or fixed roofs. The fixed roofs shall only be used in conjunction with a control device capable of achieving 98% control efficiency.

Control Measure Source: SOCMI HON

Rule Effectiveness: 99%
Control Efficiency: 95%
Rule Penetration: N/A

Source of Projected Emissions: Petroleum Refining Industry.
Identified SCCs: 306-005-03 to 06, 306-005-14 to 22.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of petroleum refinery processes in the B/PA and H/GA areas.

Estimated Costs:

Cost Effectiveness: This rule implements the MACT standards for process wastewater at the petroleum industry. Economic impact analysis presented in the HON for SOCMI chemical manufacturing shows cost effectiveness values ranging from $430 per ton to $1,600 per ton of VOC removed. A similar cost effectiveness range is expected for wastewater in the petroleum industry.

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#84) (CHEMICAL MANUFACTURING - SOCMI AIR OXIDATION, DISTILLATION & REACTOR VENTS)

Control Measure Description: The proposed measure raises the control efficiency for SOCMI air oxidation, reactor, and distillation vents from 98% to 99% and lowers the exemption level from 0.011 SCM per minute to 0.005 SCM per minute.

Control Measure Source: SOCMI HON, NSPS subpart NNN

Rule Effectiveness: 99%
Control Efficiency: 99%
Rule Penetration: N/A

Source of Projected Emissions: SOCMI air oxidation, reactor, and distillation processes.
Identified SCCs: 301-008-04, 301-018-91 and 92, 301-019-04, and 07, 301-031-02, 03, 04, and 05, 301-034-03, 04, 05, 11, and 12, 301-091-53, 301-100-03, 301-120-05, 06, 13, and 14, 301-124-05, 301-125-12, 21, 26, 27, 28, and 53, 301-133-02 and 03, 301-153-11 and 21, 301-156-03, 04, 06, and 07, 301-158-02, 03, 21, and 22, 301-167-02 and 03, 301-169-02, 301-174-02, 10, 11, and 21, 301-181-05, 301-190-04, 301-195-02, 03, 04, and 05, 301-197-45, 301-202-04 and 11, 301-205-03, 04, 05, 06, 07, 08, 09, 21, 22, 23, 24, 25, 26, 27, 28,29, 30, 31, 32, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, and 55, 301-210-02, 03, 04, and 05, 301-211-03, 22, 23, and 24, 301-250-02 and 03, 301-251-02 and 04, 301-253-02 and 06, 301-254-06, 07, 08, 12, and 13, 301-301-06, 301-303-02.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of SOCMI processes in the B/PA and H/GA areas.

Estimated Costs: This measure requires an increase in control efficiency from 98% to 99%. Such efficiency is attainable by use of thermal incinerators (both regenerative and nonregenerative) which are generally more expensive and harder to maintain when compared to open flares. Some combustion devices such as gas turbines, I. C. engines, and boilers can also be used if properly utilized. The cost of this proposal varies depending on the number of incinerators or other combustion devices that are currently present at each chemical plant and their availability to be used to attain the 99% CE. The total capital cost of a thermal incinerator ranges between $100,000 to $2,000,000 and is dependent on the design flowrate. The annual operating cost can be as high as $500,000 per year.

Cost Effectiveness:

Comments: Compliance with this proposal may require a major investment if companies have already spent the necessary capital to comply with the HON and the existing vent gas rule of Chapter 115 where both rules require a 98% control efficiency. The compliance date for the vent gas rule is November, 1996 and for the HON is March, 1997.

Reactivity and toxicity of VOC emitted from industrial incinerators vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those SOCMI processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SOCMI SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#85)
(CHEMICAL MANUFACTURING -
SOCMI AIR OXIDATION, DISTILLATION & REACTOR VENTS)

Control Measure Description: The proposed measure lowers the exemption level for SOCMI processes from 0.011 SCM per minute to 0.005 SCM per minute.

Control Measure Source: SOCMI HON, NSPS subpart NNN

Rule Effectiveness: 99%
Control Efficiency: 98%
Rule Penetration: N/A

Source of Projected Emissions: SOCMI air oxidation, reactor, and distillation processes.
Identified SCCs: 301-008-04, 301-018-91 and 92, 301-019-04, and 07, 301-031-02, 03, 04, and 05, 301-034-03, 04, 05, 11, and 12, 301-091-53, 301-100-03, 301-120-05, 06, 13, and 14, 301-124-05, 301-125-12, 21, 26, 27, 28, and 53, 301-133-02 and 03, 301-153-11 and 21, 301-156-03, 04, 06, and 07, 301-158-02, 03, 21, and 22, 301-167-02 and 03, 301-169-02, 301-174-02, 10, 11, and 21, 301-181-05, 301-190-04, 301-195-02, 03, 04, and 05, 301-197-45, 301-202-04 and 11, 301-205-03, 04, 05, 06, 07, 08, 09, 21, 22, 23, 24, 25, 26, 27, 28,29, 30, 31, 32, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, and 55, 301-210-02, 03, 04, and 05, 301-211-03, 22, 23, and 24, 301-250-02 and 03, 301-251-02 and 04, 301-253-02 and 06, 301-254-06, 07, 08, 12, and 13, 301-301-06, 301-303-02.
Total Affected Emissions (adjusted 1999 EI):

Affected Parties: Operators of SOCMI processes in the B/PA and H/GA areas.

Estimated Costs: This measure implements the MACT standards for process vents at SOCMI operations. There is no incremental capital or operating cost associated with this measure.
Cost Effectiveness:

Comments: Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those SOCMI processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SOCMI SCC code.

Staff Contact: Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#86)
(TRANSPORTATION AND MARKETING - FUGITIVE LEAKS)

Control Measure Description:	The proposed measure establishes standards and monitoring requirements and a repair schedule for leaking components at gasoline terminals and all other loading and unloading racks. The requirements mirror the fugitive emissions control requirements for the petroleum refining and chemical processes.
Control Measure Source:	TNRCC Chapter 115.212, SOCMI HON, NSPS subpart XX
Rule Effectiveness:	99%
Control Efficiency:	93%
Rule Penetration:	N/A
Source of Projected Emissions:	Transportation & Marketing Operations.
Identified SCCs:	306-888-01, 02, 03, 04, and 05.
Total Affected Emissions (adjusted 1999 EI):	
Affected Parties:	Loading and unloading operations in the B/PA and H/GA areas.
Estimated Costs:	
Cost Effectiveness:	This rule implements the MACT standards for fugitive emissions in the SOCMI chemical manufacturing. Economic impact analysis presented in the HON shows cost effectiveness values that indicate overall cost savings. These cost savings are generated by reducing the loss of valuable products in the form of emissions.
Comments:	Reactivity and toxicity of VOC vary significantly and are dependent on the process. Reactivity and toxicity should be selected for those processes which contribute the most to emissions. The processes can be identified by analyzing the reported emissions associated with each SCC code.
Staff Contact:	Gus Eghneim (512) 239-1965

EMISSION CONTROL MEASURE (#87)
STATIONARY INTERNAL COMBUSTION

Control Measure Description: Catalytic oxidation, reduction

Control Measure Source: Vendor information

Rule Effectiveness: 98%
Control Efficiency: 85%
Rule Penetration: 90%

Source of Projected Emissions: Gas-fired, stationary, reciprocating internal combustion (IC) engines and gas turbines

Identified SCCs: 2-01-001-01 through 2-88-888-03

Total Affected Emissions (Adjusted 1999 EI): 10.14 tons per ozone day

Affected Parties: Gas-fired, stationary, reciprocating IC engines and gas turbines

Estimated Costs: $12/hp for IC engine catalytic oxidation system; costs not available for gas turbines **(information being prepared by vendor)**

Cost Effectiveness: **(information being prepared by vendor)**

Comments: Oxidation catalysts represent established technology to control VOC (and CO) emissions from IC engines and gas turbines. Non-selective catalytic reduction (NSCR), a cost-effective and readily available control technology for controlling NO_x from rich-burn engines only, can be configured for optimal NO_x, VOC and CO reductions. Determining the 1990 VOC baseline may be difficult for several reasons. VOC emission factors used for the 1990 EI are not very reliable due to the extreme variability of emissions from these units. Also, there is very little test data available to document actual VOC emissions. It is important to note that VOCs emitted from natural gas-fired internal combustion units consist mainly of nonreactive methane and ethane. VOCs reported in the 1990 EI have not consistently reflected this distinction. Taking this into account will greatly affect baseline emissions and cost-effectiveness figures.

In addition, there are technical problems associated with use of oxidation catalysts on both rich-burn and lean-burn IC engines. With lean-burn engines, exhaust temperatures are typically too low for adequate oxidation catalyst performance. With rich-burn engines, lowering the exhaust gas oxygen concentration below 0.5%, as required to operate NSCR for NO_x control, can create a twofold increase in VOC emissions from the engine. This further complicates assigning a VOC baseline value before controls are applied.

Staff Contact: Mike Magee 239-1511

APPENDIX F
Texas Phased Attainment Demonstration

Texas Phased Attainment Demonstration

Modified Phase II Approach For Ozone SIP Planning

with Midcourse Realignment

INTRODUCTION

Texas has developed a number of State Implementation Plans (SIPs) to control ozone pollution and in the process has developed expertise in rule development, emissions inventory (EI), and the Urban Airshed Model (UAM). Our experience has shown that not enough time was provided for these processes when the 1990 Federal Clean Air Act Amendments (FCAAA) were developed. Table 1 provides estimates of the minimum amount of time required for major components of ozone SIP development.

The Environmental Protection Agency (EPA) recognized some of these difficulties and in March, 1995 developed a two phase approach for the submittal of the attainment demonstration SIPs for areas classified as serious and above. Phase I consisted of a set of specific control measures to be implemented, a requirement for volatile organic compound (VOC) reasonably available control technology (RACT), a requirement to obtain reductions in the amount of 9 percent of ozone precursors between 1996 and 1999 to demonstrate reasonable further progress, a submittal of UAM modeling performed, and a schedule for the Phase II SIP activities. On November 9, 1994, Texas submitted a SIP that essentially fulfilled the requirements of EPA's Phase I approach.

EPA's guidance for Phase II, to be submitted by mid-1997, would require completion of modeling and plans to demonstrate attainment of the standard by the attainment date specified in the FCAAA. By 1999 the rules to implement the attainment plans would have to be adopted. EPA had included the additional time for the Phase II modeling to allow for analysis of the impact of boundary conditions in areas affected by transport and to allow improvements in modeling techniques and in emissions inventories to be incorporated into the process.

Mary Nichols, the EPA Assistant Administrator for Air and Radiation, issued a memorandum on March 2, 1995 which provides the most recent guidance on meeting EPA's two phase attainment demonstration requirements for serious and above nonattainment areas. The memo discusses three important guidelines:

♦ Meeting the attainment dates in the Clean Air Act while maintaining progress toward attainment,

♦ Ensuring enforceability of commitments to adopt additional measures needed to reach attainment, and

♦ Promoting market-based alternatives.

The memo further states that this guidance applies to areas significantly affected by ozone transport and that EPA regional offices should determine with the states whether to apply it to other areas as well. For a severe area, such as the Houston/Galveston nonattainment area, the current EPA process requires that a SIP be developed based on an emissions inventory projected from 1990 to 2007. The Texas Phased Attainment Demonstration (TxPhAD) approach builds on these guidelines and applies them to the particular situations of the Houston/ Galveston (HGA) and Beaumont/Port Arthur (BPA) nonattainment areas.

LONG TIME HORIZON SIP PLANNING

Our experience has shown that the planning horizon of 17 years required to develop a SIP for attainment of the standard is too long to provide confidence in the effectiveness of a process which requires states to determine the controls needed 17 years into the future with current information. The TxPhAD involves a paradigm shift in ozone control. States were previously expected to identify reductions far into the future. As the Texas SIP planning process has progressed, certain limitations have surfaced which the traditional interpretation of the Clean Air Act was not flexible enough to address. These limitations include:

♦ Difficulty of reliably estimating emission growth several years into the future.

♦ Impossibility of forecasting and applying future advances in control technology.

♦ Difficulty of forecasting future national rules, establishing associated reductions, and utilizing these rules and reductions in the planning process.

♦ Inability of this planning approach to change with the various needs of the nonattainment area.

♦ Decreasing sensitivity of UAM's ozone response to changes in emissions when modeling relatively low exceedance concentrations of ozone and precursors.

♦ Large impact of changes in boundary conditions on locally generated ozone concentrations, especially as ozone concentrations approach the standard.

♦ Lack of analysis for future boundary conditions and methods to reduce these concentrations.

♦ No method to evaluate the efficacy of the current SIP planning process prior to the attainment date years in the future.

♦ No method to incorporate improvements in monitoring, such as the Photochemical Assessment Monitoring System (PAMS) data, or in photochemical modeling.

These limitations create a lack of confidence in the results of the modeling and control strategy development, which in turn makes it difficult to garner support for the indicated control strategies that must be considered for further reduction of ozone.

THE TEXAS PLAN

♦ **Realistic Time Horizon Planning**

An analysis of the time estimates in Table 1 indicates that a SIP planning period of six years is more practical than the current process. Six years is long enough to allow states and the regulated community to develop and plan the implementation of control measures, but not so long as to base such controls on unreliable forecasts. Therefore, Texas is proposing an alternative to EPA's suggested Phase II SIP process. The Texas approach provides a number of enhancements.

The TxPhAD is based on taking highly effective, well defined, measured steps toward ozone attainment, and on checking the effectiveness of the whole SIP planning process at regular intervals to ensure progress in ozone reduction. Inherent in the process is having well defined steps for making midcourse realignments so that technical innovations and better information developed after the initial submittal can be incorporated in subsequent steps. The shorter time-horizons and iterative nature of the process reduce the limitations and uncertainty of the traditional attainment demonstration. Given that the very essence of the TxPhAD is to abandon the flawed single step, long-range planning process, a requirement to perform modeling out to 2007 and determine the amount of reductions and controls necessary to achieve attainment in the initial step is inconsistent, and serves no purpose.

♦ **Paradigm Shifts**

This new approach requires a shift in three paradigms found in the FCAAA. First, the process shifts from identifying the path to attainment from one quantum step to several smaller steps. Secondly, the process focuses on obtaining reasonable progress toward reduction of <u>ozone</u> rather than reductions of ozone precursors. Thirdly, at interim steps it evaluates the effectiveness of the process before moving forward. This process allows for timely application of the following:

♦ New technical advances in emissions control,

♦ New modeling techniques,

♦ New and improved methods for emission calculation,

♦ Incorporation of results from boundary condition analyses,

♦ Use over shorter time periods of more accurate and better growth estimates,

♦ Process for integration of PAMS monitoring data, and

♦ Focus on ozone reduction instead of precursor reduction.

ELEMENTS OF THE TXPHAD

The TxPhAD is a multi-step periodic SIP process which:

♦ Establishes interim ozone targets for each step,

♦ Performs a SIP process evaluation with actual data at each step,

♦ Makes midcourse realignments when warranted, and

♦ Makes Rate-of-Progress (ROP) reductions in ozone by phasing in new controls that have been developed and tested through the model or enhancing existing controls that have been proven effective in reducing ozone during the last time period.

Each of these elements is discussed in more detail in the paragraphs that follow.

♦ Interim Dates

The time period to the attainment year will be divided into periods with interim dates. For the HGA area with an attainment date of 2007, the interim dates are 1999, 2002 and 2005. For BPA with an attainment date of

1999, the interim year is 1996, with an adjustment made if necessary for the role of intra-domain impacts. The intermediate dates are shown in Table 2.

♦ Interim Targets

EPA guidance on the use of the UAM for ozone SIP development requires that the maximum modeled concentration over the domain be used to guide control strategy development. In some cases this domain wide maximum may be greater than the maximum measured in the area, and in some cases it may be lower than the maximum measured over the area. When the model underpredicts it must be within 15% of the maximum monitored ozone value to be considered acceptable modeling. For each interim date, an ozone reduction target will be established using the modeling design value. The modeling design value will be the highest modeled concentration for all days for which acceptable modeling was achieved. For example, the interim ozone reduction for 1999 will be 9/17 of the difference between the modeled design value and the standard. The interim reduction target is then the difference between the modeling design value and the interim ozone reduction. Results of the UAM modeling with the Coastal Oxidant Assessment for Southeast Texas (COAST) data set will be used to determine the interim target concentrations. An example of how the interim ozone concentration target will be determined can be shown using the 1990 UAM modeling episode TNRCC completed for the Phase I SIP submittal in November 1994. For this episode the modeling design value for the HGA area was 0.263 ppm (the maximum monitored value was 0.202 ppm). The interim ozone reduction for 1999 would be 0.074 ppm (i.e., (9/17)[0.263-0.124]), and the interim reduction target for 1999 would be 0.189 ppm. This interim reduction target is just an example. The actual value used for the SIP may vary by a significant amount. This example is included in Table 3.

♦ Process Evaluation With PAMS Data

At the beginning of each step there will be an evaluation of the SIP development process used to develop the controls implemented in the previous step. For each interim date, actual data will be compared to the corresponding data used to develop the controls to be implemented by the interim date. The actual emissions inventory (EI) will be compared to the projected EI to determine the accuracy of the EI projection process. For each interim date the UAM predictions with the projected EI will be compared to the monitored concentrations for ozone, nitrogen oxides (NO_x), and speciated VOC. This comparison will determine if the process accurately predicts future pollutant concentrations and if confidence can be placed in the use of the process to develop plans to reduce ozone. In addition to modeling with the projected EI, modeling with the actual EI will be performed and the results compared to monitored data, enhanced by the PAMS network, to determine if the episode selection process accurately covers pertinent meteorological conditions. New episodes will be developed if warranted and added to those previously used.

For example, in May of 2000, we will perform comparisons between the 1999 PAMS data and modeled concentrations based upon the 1999 projected EI. Comparisons will be performed on a site-specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between projected EI and monitored concentrations. This will involve two steps:
1) At each monitoring site we will use PAMS VOC and NO_x monitoring data to determine the actual annual rate of VOC and NO_x reductions from 1993 to 1999 and compare them to corresponding modeled reductions from 1993 to 1999 predicted at that site. 2) At each monitoring site we will use actual PAMS ozone data to determine an ozone rate of reduction for 1993-1999 and compare it to the modeled reduction from 1993 to 1999 at that site.

♦ **Midcourse Realignments**

The TxPhAD provides a mechanism to make midcourse realignments to the planning process. The future emissions will be projected with better emissions methods that have been developed since the last time step, and will incorporate better, more accurate emission growth factors based on analysis or actual data rather than using population or economic indicators as surrogate growth estimates. Also, emissions that fluctuate with population can be better estimated with current population trends. Mobile emissions can be more accurately estimated with current trends from analysis of recent data on vehicle miles traveled, vehicle registration, roadway network modifications, and the analysis of data collected from the inspection and maintenance program.

New approaches to UAM modeling developed since the last interim date can be utilized. For example, present sensitivity analyses from across the country indicate that changes in ozone in response to changes in emissions at concentrations near the standard are not as large as when the ozone concentration is closer to the design value. Special boundary condition studies will be conducted to address this issue. As another example, it appears that the current version of the carbon bond IV (CBIV) mechanism used in the UAM may need to be updated to more accurately depict biogenic emissions. It is anticipated that within the next three years there will be modifications to resolve issues of this nature. The new SIP process will allow analysis of the episode selection to ensure that appropriate episodes have been used for SIP development. If additional episodes are needed, they will be added to those being used.

The process will allow consideration of new control technology that has been developed since the last interim date. The effectiveness of existing rules will be analyzed. If necessary, existing rules will be modified to make them more effective rather than adopting new rules.

National rules are being developed for a number of source categories, but final rules will not be available for use in development of the SIPs due in mid 1997 with the current process. The logical process would be to analyze the impact of national rules, quantify reductions from them, and then develop additional rules if needed to meet the ozone reduction target. The TxPhAD process allows this approach to proceed. To use the current process, states have to make a guess about the provisions of the future rules, estimate the corresponding reductions, and adopt potentially overlapping rules to compensate for gaps in the federal rules. Texas has had this experience with both the small engine rule and the fugitive emissions rules from the Hazardous Organic National Emissions Standards for Hazardous Air Pollutants (HON). This has resulted in duplicative efforts, law suits, and a loss of public confidence, none of which would have occurred if the TxPhAD approach had been followed.

♦ Intra-Domain Impacts

Intra-domain impacts, due to movement of pollutants withing the modeling domain from the HGA nonattainment area to the BPA nonattainment area or vice versa and from attainment areas, can play a major role in developing a plan to attain the standard. Nonattainment areas that are affected by emissions from other areas should be allowed to develop control plans that provide for attainment of the standard based only on local emissions. Additional time should be allowed to achieve attainment for areas affected by intra-domain impacts. If emissions from attainment areas are affecting an area's ability to attain the standard, time must be allowed to develop a process to reduce these emissions. It appears that the current EPA two phase approach will allow such a process in areas that have demonstrated "overwhelming transport", but the process should be available for other areas. Texas will be analyzing the effect of intra-domain impacts and simulating these impacts with boundary conditions used in the UAM.

♦ **Rate of Progress Reductions**

To provide progress towards attainment of the ozone standard, the FCAAA requires that states make reductions in precursors of ozone at a rate of 3% per year averaged over each three year period after 1996 until the standard is attained. However, modeling has shown that not all reductions in VOC or NO_x have an equal effect on ozone concentrations. Speciation, spatial, and temporal conditions all play a role in ozone formation. Large reductions in certain VOCs may yield small reductions in ozone, and vice-versa. Therefore, there is no scientific basis for a reduction of 3% per year of ozone precursors. For these reasons, the TxPhAD focuses on reductions in ozone, which is the criteria pollutant, instead of reductions in the precursors.

From 1990 to 2007, the TxPhAD provides for a measured reduction of ozone of approximately 5.88% per year averaged over each reduction period. This reduction is achieved by using modeling to dictate the most effective control strategies in the nonattainment areas for the given time periods. In practice, this reduction may or may not correspond precisely to the 3% per year reduction of precursors envisioned in the Act, but it maintains the progression of measured steps to attainment that was clearly the intent of this requirement.

Texas understands the need to maintain a database of current and future control strategies and the creditable reductions they provide for each milestone. Texas will continue to maintain this database for planning purposes, and will submit it as part of periodic SIP revisions to report progress in reducing ozone levels. The levels of VOC and/or NO_x needed to make the ozone reductions for each target year will become the ROP reduction levels. However, the planning process for ozone attainment should not be constrained by a requirement to make a guaranteed 3% per year reduction of emissions of precursors if this is incompatible with making effective and reasonable ozone reductions.

♦ **Attainment**

The TxPhAD provides for developing a SIP that shows how the standard will be met by the attainment dates mandated in the FCAAA. However, the plan will not immediately identify nor implement all rules necessary to attain the standard. Instead the process allows for a stepped approach to attainment. Texas realizes the importance of having a periodic "snapshot" of future air quality, and of the levels of reductions that may be necessary to achieve attainment of the standard. Therefore, the TxPhAD provides for an estimate of the levels of VOC and NO_x that may be necessary to attain the standard. However, this demonstration is more appropriately based on the next projected target year's EI, and not on the attainment year's EI. For example, in the 1997 submittal based on the projected 1999 EI, Texas will use across-the-board reductions to indicate the levels needed to attain the standard. In addition, the specific controls and the corresponding levels of reductions of VOC and NO_x necessary to reach the interim target concentration for 1999 will be developed using the projected 1999 EI. This approach will provide a "snapshot" and indicate the direction and magnitude of reduction to attain the standard. This process will avoid the potentially flawed approach of requiring the use of questionable data to project emissions to the year 2007, and then make decisions on implementation of controls based on modeling this questionable data.

♦ **Enforceability**

One of the fundamental principles of the TxPhAD is that Texas will make well-defined steps that lead to measured progress toward attaining the standard by the mandated attainment dates. At each step, each rule will be analyzed for its effectiveness, and enforceability concerns can be corrected in a timely fashion rather than waiting until the attainment date to perform such an analysis. This process will ensure that effective rules have been implemented. As part of EPA's Phase I SIP approach, the TxPhAD plan and a corresponding schedule will be submitted to EPA for approval. Once the approach is approved by EPA with the schedule, EPA will have "hooks" upon which EPA can take enforcement action should the state not implement part of the schedule.

♦ **Market Based Approaches**

This ozone reduction strategy is more compatible with a market-based approach. Traditionally the market-based trading approach has been difficult to quantify in such a way that it can be used for creditable VOC and NO_x requirements. Also, the offset requirements for New Source Review, banking, and trading have never been adequately addressed in a fashion which allowed credits to be taken as part of a SIP. Under the TxPhAD, the model determines if and how much ozone reduction is yielded by the trading program, and only the real ozone benefits are counted for SIP purposes. Not having to deal with the creditability of offsets makes the program much more attractive to states.

♦ **182(f) NO_x Waiver**

According to §182(f), a waiver from NO_x RACT will be granted when the Administrator determines that net air quality benefits are greater in the absence of reductions of oxides of nitrogen from the sources concerned. EPA has interpreted this to mean that in the HGA and BPA areas only a temporary NO_x waiver can be granted based upon interim UAM modeling which shows that NO_x reductions would be a disbenefit in the area. EPA has granted the two year temporary waiver under the presumption that by May 1996 Texas will have submitted a full attainment demonstration, based upon the COAST study, which definitively indicates the role of NO_x reductions. EPA has expressed concern that the TxPhAD contravenes this guidance because it does not contain modeling which would attempt to predict the efficacy of NO_x reductions at the attainment date.

The premise upon which Texas petitioned EPA for a temporary waiver was based upon the argument that the UAM model using the COAST data would allow for better science to dictate the necessity and the degree of NO_x controls. The TxPhAD is taking this same premise and applying it to the entire attainment demonstration process. Texas will perform modeling for each interim target year to determine the direction and level of controls necessary to attain the target at that time. For example, in 1996, modeling will be done based on the projected 1999 EI to determine the levels of VOC and NO_x which would be necessary to attain the target (e.g., 0.189ppm; see Table 3). This modeling will be used to provide directional guidance for the time period through 1999 regarding the benefit of future NO_x controls in the reduction of ozone. If this modeling showed that NO_x controls would be beneficial to reducing ozone levels to the 1999 target, action would be taken to remove the temporary §182(f) waiver and to implement NO_x controls. If the modeling showed that reductions in NO_x were not beneficial to reductions in ozone, action would be taken to extend the §182(f) waiver to the year 1999. The same rationale would apply to the other segments. This approach will provide directional guidance for decision making about NO_x controls, while avoiding the pitfalls of long time-horizon modeling.

The NOx waiver applies to EPA's Transportation Conformity rule, which was originally granted under §182(f) of the 1990 CAAA. However, due to a recent court interpretation, further action in Transportation Conformity will be taken under §182(b)(1) of the 1990 CAAA.

♦ **EPA Adjusted Attainment Plan Goals**

There are five goals that EPA has identified in adjusting the attainment plan strategy. The TxPhAD is designed to fulfill these goals.

♦ <u>No need to reopen the Clean Air Act</u>. This process meets the goals and spirit of the FCAAA. However, the process will have to be evaluated to ensure that it can be interpreted to meet the requirements of the FCAAA.

♦ <u>Proceed with substantial emission reductions</u>. This process provides for phase-in of emission controls to control ozone. The process will allow new controls and technical advances to be utilized that could not be identified prior to 1995.

♦ <u>Politically acceptable approach</u>. This process provides for attainment of the standard in a timely manner. It allows the process to be evaluated in the interim to determine that the best course is being followed and that this process has been proven to be effective in the area.

♦ <u>Provide economic certainty</u>. Growth factors are routinely evaluated every six years to ensure that they provide for better future emission estimates. This decreases the length of the planning horizon from 17 years to 6 years and ensures that adjustments made for growth are closer to actual growth levels. Periodically before new rules are developed, this process evaluates the efficacy of previously adopted rules and rule effectiveness estimates, both of which can greatly influence emission estimates. This evaluation provides for more accurate emission estimates which are used to determine new rules. This process provides for greater economic certainty since rules are developed only after it is clear that they are needed to reach the reductions required by the next step.

♦ Sound scientific approach. The process is more scientifically sound than the current approach since it provides for periodic evaluation and feedback using actual emissions and PAMS monitoring data. This process allows for midcourse realignments to be made based on scientific process analysis prior to the final attainment demonstration. The process also focuses on the ozone standard, rather than on precursors for ozone.

CONCLUSION

EPA has recognized many of the limitations of the attainment demonstration planning process described in the FCAAA, and has developed a phased process which partially addresses these difficulties. The State of Texas has built upon this approach to account for the unique situations of the HGA and BPA nonattainment areas. Instead of being tied to long time-horizon forecasting to make arbitrary reductions in precursors, the Texas approach uses the best available modeling and control strategy science to make real reductions in ozone. Texas will continue its long-standing commitment to improve air quality in partnership with local governments, consumers, small business, industry, and the EPA.

The State believes that the Texas Phased Attainment Demonstration is more reasonable and more scientifically sound than EPA's phased attainment demonstration approach, while still meeting the goals of the 1990 CAAA and the March 2, 1995 Mary Nichols memo. Texas believes that the statutory intent does allow the flexibility to approve an approach envisioned by the Texas Phased Attainment Demonstration.

Table 1

Time Required for SIP Processes

Prepare actual emissions inventory	1 year
Perform UAM modeling with existing base case using new inventory	6 months
Prepare projected emissions inventory	3 months
Develop new UAM base cases	1.5 years
Develop new rules	7 months
Adopt new rules	6 months

Table 2

Summary of Modified Phase II SIP Planning

SIP Plan Date (*)	Compare** Monitoring W/Projected EI		Compare** Monitoring W/Actual EI		EI		Date Modeling Complete	Date SIP Submitted	Extend 182(f) Date
	Year	Date	Year	Date	Base Year	Projected Year			
1996					1993	1996	5/96	11/96****	
1999					1993	1999	12/96	5/97	1999
2002	1996	5/97	1996	6/98	1996	2002	11/98+	12/99+	2002
2005	1999	5/00	1999	6/01	1999	2005	11/01+	12/02+	2005
2007	2002	5/03	2002	6/04	2002	2007	11/04+	12/05+	PERM

* Date of interim ozone target. Controls developed to reach interim target for this date.

** Comparison of monitoring data with modeled concentrations based on projected EI.

*** Comparison of monitoring data with modeled concentrations based on actual EI.

**** The 11/96 SIP submittal will address only BPA

+Assumes no new modeling episodes. If new episodes are needed, add 9 months to date.

Table 3

Example of Interim Ozone Reduction Targets with the Modified Phase II SIP Approach

Houston/Galveston Area

The following is an example of how the modified SIP approach could be applied to the HGA ozone nonattainment area to determine interim ozone reduction targets. The HGA area must attain the standard by 2007. First divide the time to attainment into five three-year segments. Each segment has a target year and a target ozone concentration to attain.

Example:

Houston 1990 episode modeled with UAM.

The modeling design value for this episode is 0.263 ppm.

Target years	ozone target
1993	0.238 ppm
1996	0.214 ppm
1999	0.189 ppm
2002	0.165 ppm
2005	0.140 ppm
2007	0.124 ppm

Modified Phase II SIP Approach

Timelines

Step 1 - 1996 Analysis

Dec, 1995	Complete development of UAM Base Cases with COAST data. Using 1993 EI, complete development of projected 1996 EI with 15% rate of progress.
May, 1996	Complete UAM modeling with projected 1996 EI and determine if B/PA would meet attainment by 1996 but for intra-domain impacts from movement of pollutants within the modeling domain.
November, 1996	Submit SIP to EPA

Step 2 - 1999 Analysis

Aug, 1996	Using 1993 EI, complete development of projected 1999 EI with 9% rate of progress (ROP) from 1996 to 1999. Complete boundary condition study for UAM modeling. Determine impact of emissions from attainment areas and other nonattainment areas on the HGA area. The BPA area would be included if it failed to show attainment under Step 1. Determine if controls in attainment areas are needed.

Dec, 1996 Complete UAM modeling with projected 1999 EI and determine if meet 1999 interim target.

Reductions of 3% VOC per year from 1996 to 1999 have been implemented.

Based on state and federal rules existing by 1999 and future federal rules, determine projected annual reductions in VOC (and NO_x, if applicable) between 1999 and 2002.

To address the temporary 182(f) waiver, UAM modeling with the projected 1999 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 1999 interim ozone target. If NO_x controls are not beneficial in meeting the 1999 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 1999.

May, 1997

Submit SIP to EPA.

<u>Step 3 - 2002 Analysis</u>

Compare Monitoring to Projected Reductions for 1996

May, 1997 Comparisons between 1996 PAMS and projected modeled concentrations.

Comparisons to be performed on a site specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between the 1996 projected EI and monitored concentrations.

1. At each monitoring site use PAMS VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1993 to 1996 and compare to corresponding modeled reductions from 1993 to 1996 predicted at that site.
2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1993-1996 and compare to modeled reduction from 1993 to 1996 at that site.

Compare Monitoring to Actual Reductions for 1996

Performance Evaluation of 1996 SIP Process

Dec, 1997 — Complete actual 1996 EI.

June, 1998 — Complete UAM modeling with actual 1996 EI with COAST base cases. Performance evaluation of 1996 SIP process using actual 1996 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.

1. Complete comparison of actual 1996 EI to projected 1996 EI.
   a. Determine effectiveness of rules.
   b. Begin modification of existing rules if appropriate.
   c. Develop new rule effectiveness values if appropriate.
   d. Complete analysis of accuracy of growth projections used to develop projected 1996 EI.

e. Complete development of new growth projections for 2002 based on comparison of actual 1996 and projected 1996 EIs, economic growth data, and other information.

2. Complete comparison of ozone, NO_x, and speciated VOC between:

   a. modeling with projected 1996 EI, versus

   b. modeling with actual 1996 EI, and both versus

   c. monitoring for 1996.

3. Begin development of new 1996 base cases if needed.

Plan to Meet 2002 Interim Ozone Target

Sept, 1998	Use actual 1996 EI to complete projected 2002 EI.
	Complete 2002 boundary condition modeling with regional version of UAM.
Nov, 1998	Complete UAM modeling of projected 2002 EI with COAST base cases.
	Use UAM modeling to determine controls to attain the 2002 interim ozone target.
	To address the temporary 182(f) waiver, UAM modeling with the projected 2002 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 2002 interim ozone target. If NO_x controls are not beneficial in meeting the 2002 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 2002.
	Based on the projected 2002 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

If no new 1996 base cases were needed:

May, 1999 Complete new rules to meet 2002 interim ozone target.

Determine rate of progress target for reductions of VOC (and/or NO_x) for 2000 to 2002 to meet the 2002 interim ozone target.

Based on state and federal rules existing by 2002 and future federal rules, determine projected annual reductions in VOC (and NO_x , if applicable) for 2003 to 2005.

Dec, 1999 Adopt new rules to meet 2002 interim ozone target based on modeling with COAST base cases.

If new 1996 base cases were needed:

Aug, 1999 Complete development of new 1996 base cases.

Oct, 1999 Complete modeling of projected 2002 EI with 1996 base cases.

Use UAM modeling with 1996 base cases to determine additional controls needed to attain the 2002 interim ozone target.

Based on 1996 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver.

Based on the projected 2002 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

Mar, 2000 Complete additional new rules to meet 2002 interim target ozone target.

Based on 1996 base cases, determine new rate of progress target for reductions of VOC (and/or NO_x) from 2000 to 2002 to meet the 2002 interim ozone target.

Based on state and federal rules existing by 2002 and future federal rules, determine the projected annual reductions in VOC (and NOX, if applicable) for 2003 to 2005.

Aug, 2000 Adopt new rules to meet 2002 target with 1996 base case modeling.

<u>Step 4 - 2005 Analysis</u>

Compare Monitoring to Projected Reductions for 1999

May, 2000 Comparisons between 1999 PAMS and projected modeled concentrations. Comparisons to be performed on a site specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between the 1999 projected EI and monitored concentrations.

1. At each monitoring site use PAMS' VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1996 to 1999 and compare to corresponding modeled reductions from 1996 to 1999 predicted at that site.

2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1996-1999 and compare to modeled reduction from 1996 to 1999.

Compare Monitoring to Actual Reductions for 1999

Performance Evaluation of 1999 SIP Process

Dec, 2000 Complete actual 1999 EI.

June, 2001 Complete UAM modeling with actual 1999 EI with COAST and 1996 base cases. Performance evaluation of 1999 SIP process using actual 1999 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.

1. Complete comparison of actual 1999 EI to projected 1999 EI.
   a. Determine effectiveness of existing rules.
   b. Begin modification of existing rules if appropriate.
   c. Develop new rule effectiveness values if appropriate.
   d. Complete analysis of accuracy of growth projections used to develop projected 1999 EI.
   e. Complete development of new growth projections for 2005 based on comparison of actual 1999 and projected 1999 EIs, economic growth data, and other information.
2. Complete comparison of ozone, NO_x, and speciated VOC between:
   a. modeling with projected 1999 EI, versus
   b. modeling with actual 1999 EI, and both versus
   c. monitoring for 1999.
3. Begin development of new 1999 base cases if needed.

Plan to Meet 2005 Interim Ozone Target

Sept, 2001 Use actual 1999 EI to complete projected 2005 EI. Complete 2005 boundary condition modeling with regional version of the UAM.

Nov, 2001	Complete UAM modeling of projected 2005 EI with COAST and 1996 base cases.
	Use UAM modeling to determine controls to attain the 2005 interim ozone target.
	To address the temporary 182(f) waiver, UAM modeling with the projected 2005 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 2005 interim ozone target. If NO_x controls are not beneficial in meeting the 2005 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 2005.
	Based on the projected 2005 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

If no new 1999 base cases were needed:

Jul, 2002	Complete new rules to meet 2005 interim ozone target.
	Determine rate of progress target for reductions of VOC (and/or NO_x) from 2003 to 2005 to meet the 2005 interim ozone target.
	Based on state and federal rules existing by 2005 and future federal rules, determine projected annual reductions in VOC (and NO_x , if applicable) for 2006 and 2007.
Dec, 2002	Adopt new rules to meet 2005 interim ozone target based on modeling with COAST and 1996 base cases.

If new 1999 base cases were needed:

Aug, 2002	Complete development of new 1999 base cases.

Oct, 2002	Complete modeling of projected 2005 EI with 1999 base cases. Use UAM modeling with 1999 base cases to determine additional controls needed to attain the 2005 interim ozone target. Based on 1999 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver. Based on the projected 2005 EI determine the levels of VOC and NO_x to reach attainment of the standard.
Mar, 2003	Complete additional new rules to meet 2005 interim target ozone target. Based on 1999 base cases, determine new rate of progress target for reductions of VOC (and/or NO_x) from 2003 to 2005 to meet the 2005 interim ozone target. Based on state and federal rules existing by 2005 and future federal rules, determine projected annual reductions in VOC (and NOX if applicable) for 2006 and 2007.
Aug, 2003	Adopt new rules to meet 2005 target with 1999 base case modeling.

<u>Step 5 -2007 Analysis</u>

Compare Monitoring to Projected Reductions for 2002

May, 2003	Comparisons between 2002 PAMS and projected modeled concentrations. Comparisons to be performed on a site specific basis between monitored values and

corresponding modeled values. This analysis will evaluate trends between the 2002 projected EI and monitored concentrations.

1. At each monitoring site use PAMS VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1999 to 2002 and compare to corresponding modeled reductions from 1999 to 2002 predicted at that site.
2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1999-2002 and compare to modeled reduction from 1999 to 2002.

Compare Monitoring to Actual Reductions for 2002

Performance Evaluation of 2002 SIP Process

Dec, 2004 Complete actual 2002 EI.

June, 2004 Complete UAM modeling with actual 2002 EI with COAST, 1996, and 1999 base cases.

Performance evaluation of 2002 SIP process using actual 2002 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.

1. Compare actual 2002 EI to projected 2002 EI.
   a. Determine effectiveness of existing rules.
   b. Begin modification of existing rules if appropriate.

c. Develop new rule effectiveness values if appropriate.

d. Complete analysis of accuracy of growth projections used to develop projected 2002 EI.

e. Complete development of new growth projections for 2007 based on comparison of actual 2002 and projected 2002 EIs, economic growth data, and other information.

2. Complete comparison of ozone, NO_x, and speciated VOC between:

   a. modeling with projected 2002 EI, versus

   b. modeling with actual 2002 EI, and both versus

   c. monitoring for 2002.

3. Begin development of new 2002 base cases if needed.

Plan to Meet Standard in 2007

Sept, 2004 — Use actual 2002 EI to complete projected 2007 EI. Complete 2007 boundary conditions modeling with regional version of the UAM.

Nov, 2004 — Complete UAM modeling of projected 2007 EI with COAST, 1996, and 1999 base cases.

Use UAM modeling to determine controls to attain the standard by 2007.

To address the temporary 182(f) waiver, UAM modeling with the projected 2007 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the standard. If NO_x controls are not beneficial in meeting the standard by 2007, action will be taken to make the 182(f) waiver permanent.

If no new 2002 base cases were needed:

Jul, 2005	Complete new rules to meet the standard by 2007. Determine rate of progress target for reductions of VOC (and/or NO_x) for 2006 and 2007 to meet the standard.
Dec, 2005	Adopt new rules to meet standard by 2007.

If new 2002 base cases were needed:

Aug, 2005	Complete development of new 2002 base cases.
Oct, 2005	Complete modeling of projected 2007 EI with 2002 base cases. Use UAM modeling with 2002 base cases to determine additional controls needed to attain the standard by 2007. Based on 2002 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver.
Mar, 2006	Complete additional new rules to meet standard by 2007.
Aug, 2006	Adopt new rules to meet standard by 2007 target with 2002 base case modeling.